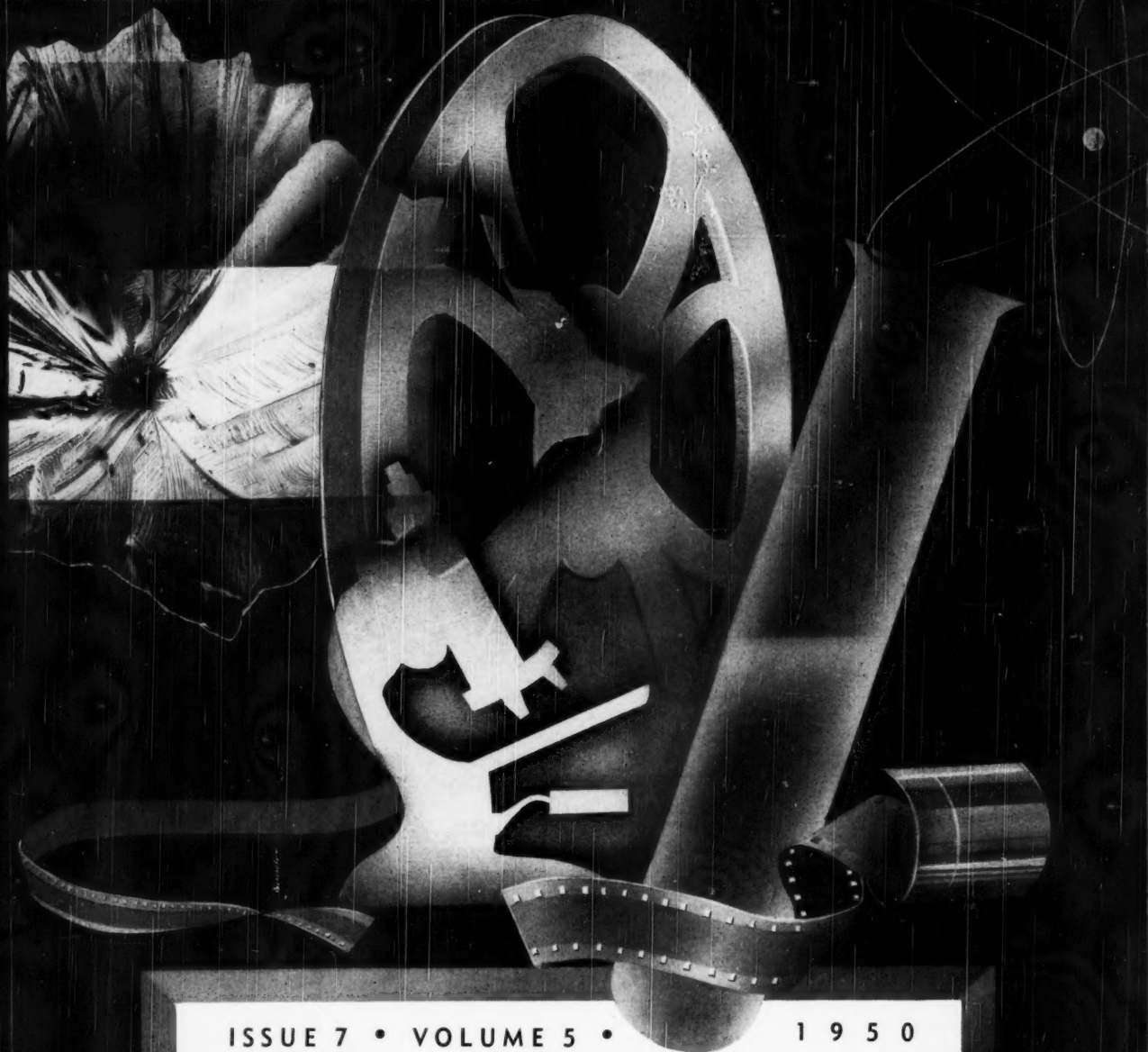


See & Hear

SCIENCE VISUALIZED

INCLUDING MOTION PICTURES • FILMSTRIPS • AND RECORDING

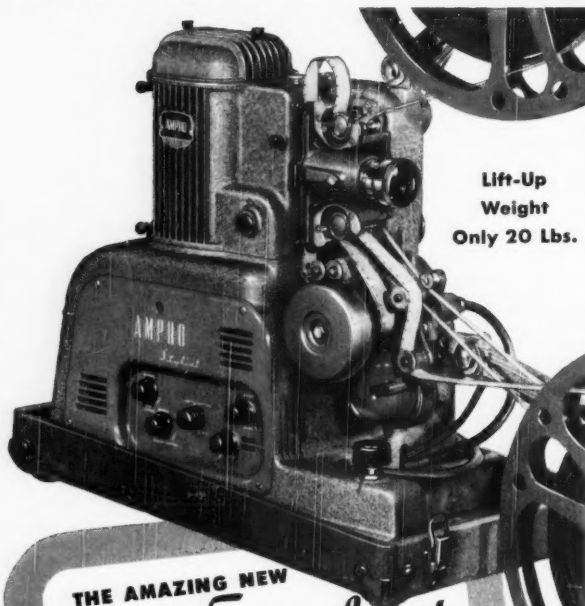


ISSUE 7 • VOLUME 5 •

1950

FEATURING: SCIENCE LOOKS TO THE SCREEN
TEACHERS IN TRAINING • NEW A-V HORIZONS
AND A CHECKLIST OF SCIENCE FILMS • FILMSTRIPS

A Truly *LIGHTWEIGHT* Low Cost 16 mm. Sound Projector!



Lift-Up
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Amazingly compact and portable—the Stylist can be readily moved from room to room for use by large or small groups. Quick and easy to set-up... just lift off case, snap permanently attached reel arms in place and the new low cost "Stylist" is ready to thread. Centralized control panel makes operation remarkably simple.

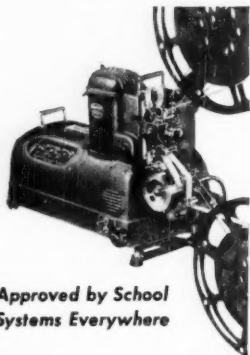
Many Other Advantages

Ampro quality features include: Designed for both efficient sound and silent speeds... standard time-tested Ampro sound head, fast automatic re-wind, triple claw film movement, new, slide-out removable film gate, coated super 2-inch F 1.6 lens, 1000 watt lamp... and many other Ampro "extras" that mean smooth, trouble-free performance year after year... A.C. and D.C. operation.

THE AMAZING NEW
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16mm. PROJECTOR
ONLY \$325 Complete, including jack for
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—and for larger Auditoriums... use

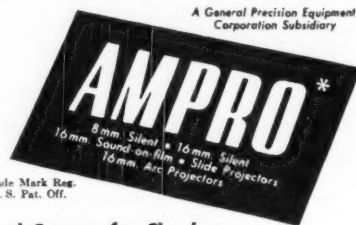
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YOUR MOST EFFECTIVE TEACHING AID TO...

*study
the
PAST*



FRANCE: BACKGROUND FOR LITERATURE

*understand
the
PRESENT*



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for the
FUTURE*



EARNING MONEY WHILE GOING TO SCHOOL

Here are films that make your study unit more interesting . . .
stimulate purposeful learning . . . increase retention . . .
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This month CORONET FILMS presents—in addition to the above new films—
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materials in the areas of youth counseling . . . personality adjustments . . .
and social responsibilities—the *best* in classroom motion pictures.

Coronet Films

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A typical letter from our file:

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All-steel, rigid, non-warp frame, with glass. Protects against finger prints, scratches, dust. Rounded edges for easy insertion into viewer or projector. May be used over and over—simple snap assembly.



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PROGRESS REPORT

AN EDITORIAL REVIEW

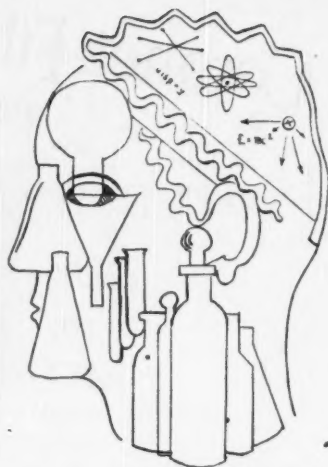
AUDIO-VISUAL DIRECTORS in schools and colleges throughout the U. S. (and abroad) have confirmed the useful role of the new SEE & HEAR curriculum program by their enthusiastic letters and by the solid fact of their increasing bulk orders for additional copies of each issue of this publication.

Widening their relationships and expanding their useful services in new schools and additional classrooms through this timely and well-supported editorial program, the educational and commercial film libraries as well as city, county, and state a-v leaders are performing their true function in the audio-visual field. We are simply providing the tools for the job and it is gratifying that these new tools are sharp and useful.

In retrospect, we frankly acknowledge the errors and shortcomings of this difficult first year of experiment. We now have the experience to improve features and to expand new areas of content as well as to balance the material so that each issue satisfies the greatest number of our readers. But we have also begun to provide the superintendent and principal with education's first low-cost Audio-Visual Reference Library of Related Materials. Did you ever see an uninitiated teacher or special department head try to use one of the several general and expensive all-purpose materials guides?

No other audio-visual publication has attempted this task. Our contemporaries continue to divide their contents between the school and the church, with less than necessary service to either, or give so little that they are hardly worth the paper they are printed on. It takes time, effort, and determination to seek out new authorities in these special fields, to put aside an easier repetitive makeup formula, and to blaze entirely new trails with each succeeding issue.

We continue this effort into the remaining weeks of the current school year. New areas of content have been discovered; new and important editorial features are already in production. When they are concluded by June, 1950, we may truly say: *we have pioneered.* More im-



portant, we can also point to the largest active circulation of any specializing audio-visual publication directly aimed at the school market.

Our thanks are due to authorities like Nathan Neal, president of the Science Teachers Association, members of his board, and to the experienced science department heads and teachers who have contributed to this SCIENCE VISUALIZED issue of SEE & HEAR. Their practical guidance will help thousands of other science teachers throughout the world to do a better and a richer job in an area of instruction of unparalleled importance in our time.

—OHC

See & Hear Magazine

812 N. Dearborn St., Chicago 40

New York Bureau

Robert Seymour, Jr., in Charge
489 Fifth Avenue

Los Angeles Bureau

Edmund Kerr, in Charge
6605 Hollywood Boulevard

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SEE and HEAR

GENERAL SCIENCE

Distributing Heat Energy
Elements of Electrical Circuits
Series and Parallel Circuits
Development of Communication
Machine Maker
Conservation of Natural Resources
Work of Rivers
Ground Water
Work of the Atmosphere
Geological Work of Ice
Mountain Building
Volcanoes in Action
Forest Grows
Forest Produces
Forest Conservation
Consumption of Foods
Distribution of Foods
Petroleum
Gas for Home and Industry
Water Power
City Water Supply
Animal Life
Water Cycle
Atmosphere and its Circulation
Earth in Motion
Solar Family
Moon
Exploring the Universe
Home Electrical Appliances
Simple Machines
Fuels and Heat

NATURAL SCIENCE

Earth's Rocky Crust
Wearing Away of the Land
Work of Running Water
Water Cycle
Common Cold
Care of the Skin
Save Those Teeth
Making Bricks for Houses
Making Glass for Houses
Synthetic Fibres
Fire
Making Electricity
Gardening
Sunfish
Snapping Turtle
Frog
Beach and Sea Animals
Honey Bee
Mosquito

House-Fly-Spiders

Butterflies
Moths
Beetles
Aphids
Ants
Pond Insects
Reactions in Plants and Animals
How Nature Protects Animals
Birds of Prey
Thrushes and Relatives
Water Birds
Circus Day

Light Waves and their Uses
Theory of Flight
Problems of Flight

HEALTH AND HYGIENE

Fundamentals of Diet
Foods and Nutrition
Defending the City's Health
Immunization
Tuberculosis

First Aid
Home Nursing

BIOLOGY

Heart and Circulation
Work of the Kidneys
Endocrine Glands
Nervous System
Mechanisms of Breathing

Digestion of Foods

Alimentary Tract

Foods and Nutrition
Alcohol and the Human Body
Control of Body Temperature
Posture and Exercise
Care of the Feet
Eyes and their Care
Ears and Hearing
Teeth
Body Defenses Against Disease

Immunization

Reproduction Among Mammals

Heredity
Plant Growth
Roots of Plants
Leaves
Flowers at Work
Seed Dispersal
Fungus Plants
Dodder
Plant Traps

Tiny Water Animals

AGRICULTURE

Our Soil Resources
Seeds of Destruction
Production of Foods
Birth of the Soil
Arteries of Life
This Vital Earth
Science and Agriculture

Are you using all

Animals Growing Up
Zoo

the more than 132

CHEMISTRY

Science Films from the

Molecular Theory of Matter

unparalleled EBFilms Library?

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Norwegian Children
Italian Children
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Electrostatics
Electrodynamics
Electrons
Sending Radio Messages
Receiving Radio Messages
Vacuum Tubes
Energy and its Transformations
Thermodynamics
Sound Waves and their Sources
Fundamentals of Acoustics
Sound Recording and Reproduction

GOOD TEACHERS CHOOSE EBFILMS FIRST

For 20 years EBFilms have had the complete confidence of teachers. Because teachers know they can be sure with EBFilms, whatever the interest area. They know they can count on EBFilms to get right down into the curriculum... do an authentic, forceful teaching job in every subject. Little wonder good teachers always choose EBFilms first. Little wonder more than 70% of all teaching films in use in America's classrooms today are Encyclopaedia Britannica Films.



ENCYCLOPAEDIA BRITANNICA FILMS INC.

Wilmette, Illinois

NEW YORK • LONDON • CHICAGO • BOSTON • ATLANTA • DALLAS • PASADENA

Science: Seen and Heard

• THE SEE & HEAR EDITORIAL •

THE EXPRESSION "I see" is an integral part of our conversation. It isn't there by accident! We unconsciously recognize that when we *see*, we *understand*! In any conversation in the classroom or on the street corner, when our explanation to the learner is complete, he nods his head with understanding and exclaims, "I see".

When we learn, we gain an impression. Those impressions which we retain with clarity and understanding are usually those which grow out of the interaction of our prime sensory mechanisms — the eye and the ear. Thus when we gain understanding, it is usually because we have seen, we have examined, and we have understood.

In the field of science education the reality which we bring to our learning experiences in most cases determines the clarity of our understanding. We have adopted the demonstration method in our science laboratories. We have developed the idea of the investigating of our community for tangible evidences of science laws, hypotheses, and theories which we explore during our science work.

It is not always possible, however, actually to experience the thing which we teach in science. Thus, today we turn with more and more confidence to newly pro-

duced teaching materials which will bring this world of scientific environment right into our classrooms. Through time-lapse photography we condense occurrences which happen too slowly for our observation. Through high-speed photography we slow down phenomena in nature which happen too rapidly for our examination. Through our ability to send the camera into inaccessible places — the highest mountain peaks, the deep valleys of the ocean, or the furthest reaches of the Gobi Desert — we can capture worth-while experiences for our learners, to be used at exactly the time and under the study circumstances we wish!

In the short space of the last decade we have been able to probe areas of our science environment which heretofore were inaccessible. Today we can bring animation into our classroom to reveal the essence of atomic fission, the underlying operational explanation of jet propulsion or of the steam turbine. On the other hand we can see, in a short space of time, natural phenomena that in the ordinary situation may take months to observe, — all through the new teaching media, the slide, the micro-projector, sound film and filmstrip.

The late Dr. Glenn Frank reports his initial opportunity of viewing such a science teaching material, the sound film *Plant Growth**. His words are as follows:

"Yesterday within the space of ten minutes, I saw a plant grow to full maturity, bear fruit, and die. As a child I often stood with awe before the mystery of (CONTINUED ON THE FOLLOWING PAGE EIGHT)

* *Plant Growth*, Sound, 10 minutes, Black and White; Encyclopedia Britannica Films, Wilmette, Illinois.

ACADEMY FILMS  RATE HIGH!
★★★★

According to a Bulletin issued by the Audio-Visual Center of Indiana University . . . of all educational films produced for national distribution by established, recognized film producers —


**"Circus Animals" — An Academy Film
HEADS THE LIST
as the most widely used film*
IN THE INDIANA UNIVERSITY LIBRARY**

— and 21st on that list of 108 most widely used films in the I. U. library is Academy's "CIRCUS PEOPLE."

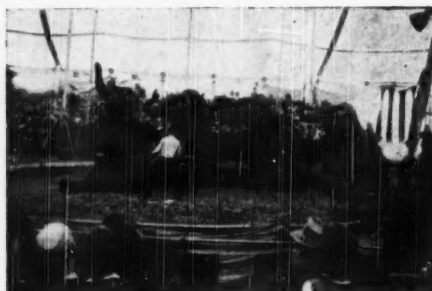
* (The film, "Your Indiana State Parks," made by Indiana U. A-V Center, Indiana Dept. of Conservation, for local viewing, exceeded "Circus Animals" in bookings by a slight margin — but this picture is not classed as a commercially produced, nationally distributed film.)

Educators say, "Good films are made by a select few."
Academy Films Rate High in Instructional Value and Usaget

Your attention is directed to "CIRCUS SHOW"
— a new release filmed by request, now available.


Look to ACADEMY
for Only the Finest
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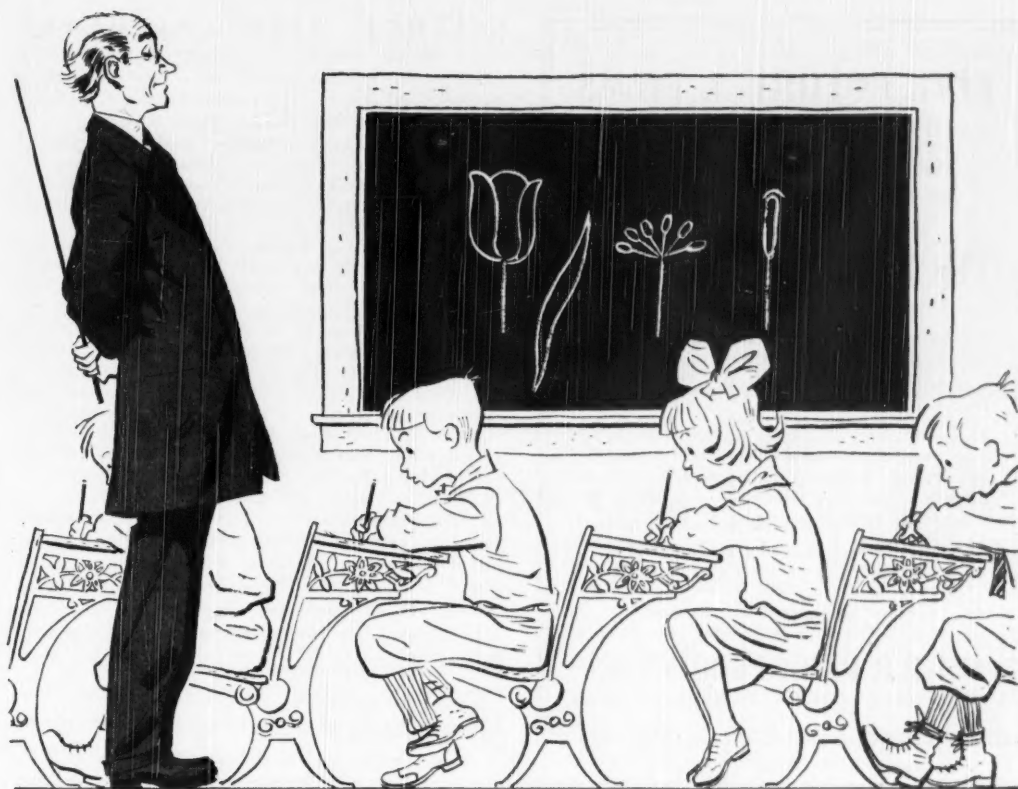


One of the Elephants acts in "Circus Show"

Three Great Circus Pictures

- ★ "CIRCUS PEOPLE" (IN COLOR AND B & W)
— how they live and work "behind the scenes."
- ★ "CIRCUS ANIMALS" (IN COLOR AND B & W)
— how they are cared for, trained and worked.
- ★ "CIRCUS SHOW" (IN B & W ONLY)
— thrilling highlights of the circus performance.

Previews prints sent to those interested in considering films for purchase. Write for Catalog of all Academy films.



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We'd rather show you how much audio-visual methods can add to your whole school program—make your teaching really *come alive*!

Ask your nearest Bell & Howell representative to arrange for you to see our special sound film, "The Show Must Go On." It tells just what features you should look for in a projector to make your audio-visual program most effective.

Good projection is absolutely essential in classroom work. With the Bell & Howell Filmosound you get *unobtrusive* operation...dependable performance that means *most* hours of projection time. And it's guaranteed for life*. With six-inch built-in speaker, \$399.50. (Larger, separate speakers available.)



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The Mountains
The Valleys

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A NEW film to explain the importance of this majestic region and HOW it was formed. Today's landscape is interpreted in terms of its geologic past.

The relationship of plants and animals to this spectacular environment is portrayed as the film story moves from the plains of glacial debris, up through the swampy river valleys, to the barren crags above timber line.

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(Free catalog describing all films
available on request)

ARTHUR BARR PRODUCTIONS

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SCIENCE: SEEN AND HEARD

(CONTINUED FROM THE PRECEDING PAGE SIX)
plant growth and wondered what it might be like to see the actual processes of growth as I saw my playmates run back and forth across the village lawn.

"I had to wait forty years to see it, but yesterday the thing I wondered about as a child, happened. I saw the processes of growth as clearly and as plainly as this morning I see motors streaming by in the street below my hotel window.

"Conan Doyle had not come back to show me marvels in a seance. I was not under the delusive spell of a magician. I was simply watching an educational film on plant growth.

"A pea was dropped on the ground. Soon its side burst open and a white sprout, or whatever the experts call it, came peering with manifest curiosity out into the open. The white sprout turned downward and began nosing about for a way to burrow downward in the soil. It nosed about with an appearance of almost animal sense. Soon it began its downward journey into the soil which had been cut away so the camera could catch the downward journey of the root."¹

Today we begin to observe some of the opportunities which are available through currently produced audio-visual materials in the areas of science, nature study, physics and chemistry. It is in the interest of the science teacher who seeks to improve her means of instruction that the following science materials and film lists have been planned.

—W. A. Wittich

¹ Dr. Glenn Frank, Written following a film preview at Bureau of Visual Instruction, University of Wisconsin.

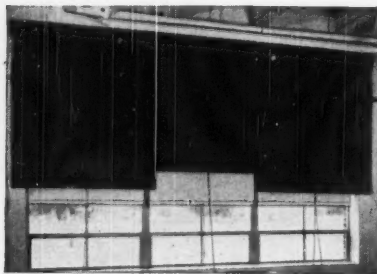
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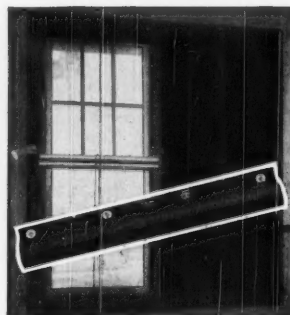
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Your Building and Equipment file should contain a copy of "Specify the Line of Special Design," furnished promptly upon request.



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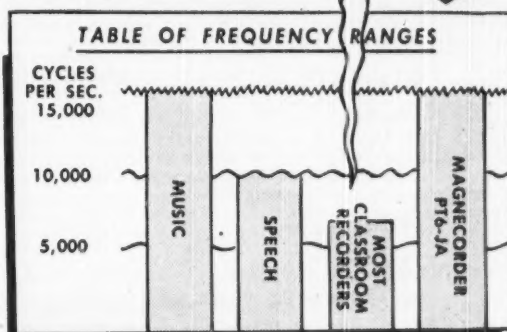
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LUTHER O. DRAPER SHADE CO., Dept. SH3, SPICELAND, IND.

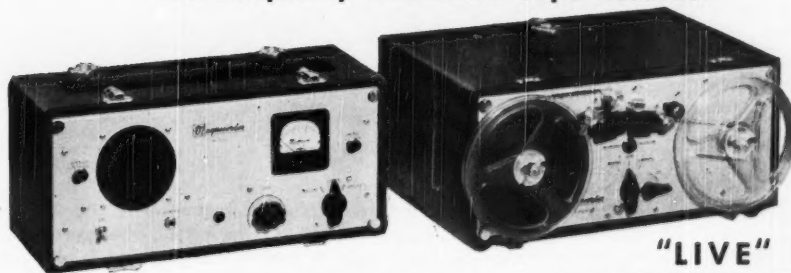
*You Can't Teach the Living
with **DEAD** SOUNDS
in your school recordings*

Full Frequency Magnecording Brings You "LIVE" Sounds

Hear it yourself and you'll appreciate the "live" difference of Magnecord full frequency reproduction. You double the frequencies and you double teaching effectiveness with life-like quality in speech and music. Such high fidelity reproduction holds attention as only living sound can. Magnecording is so easy, so trouble free. Play back instantly; recordings never lose quality—or can be erased for re-use.



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Of all moderately priced magnetic tape recorders the Magnecorder PT6-JA is the only one that reproduces sounds from 50 to 15,000 cycles per second (twice the range of others) with the extremely low allowable distortion, flutter, and "wow" standards established by the broadcasting industry.

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School.....

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FRITH FILMS

NEW RELEASES

Films on the actual procedures of the United States Officials who, day and night, in peacetime and in war, guard our borders and ports of entry. How do these men prevent foreign diseases from entering the United States? How do they prevent the illegal entry of goods? What laws govern people who enter a strange country? These films contain information that is important to the young people of America. The lessons are real and will be remembered. The subject matter is exciting.

The films contain significant material for upper elementary and secondary grades studying geography, social studies, public health, foreign trade, and international relations.

THE U. S. CUSTOMS SAFEGUARDS OUR FOREIGN TRADE

No. 358, 600 ft., 16mm., color, sound, 16 minutes, price \$95.00

The fascinating work of the U. S. Customs Inspectors at our border stations, our harbors, and our air ports of entry. Last year 50 million people arrived in the United States and were examined by the U. S. Customs Service. Detail is included in the examination of freighters and a passenger liner. The film clearly presents the suspense of people crossing an international border. Travelers are examined by a machine like an X-ray machine that sees through everything except hard objects such as metals or precious stones. The searching squad examines a ship from bow to stern for narcotics.

GUARDIANS OF OUR COUNTRY'S HEALTH

No. 359, 600 ft., 16mm., color, sound, 16 minutes, price \$95.00

The U. S. Public Health Doctors and Quarantine Inspectors carefully supervise all people entering here from foreign countries so that no disease can be brought into the United States. In this film a plane from Mexico passes quarantine. Ships from Europe, Asia, and South America present different health problems, and the Quarantine Officers carry on their work with tact and efficiency. On the colorful Mexican border, the people take tests and pass the medical requirements for entry into the United States.

UNITED STATES DEFENSE AGAINST FOREIGN PLAGUE

No. 360, 400 ft., 16mm., color, sound, 11 minutes, price \$65.00

The U. S. Public Health Sanitary Inspectors examine all ships and cargo that enter the United States. You will enjoy the monkeys, cats, and wild animals which all have their special laws. An inspector examines a large ship and calls for a fumigation. The men wear masks and work in pairs, placing the discs of poison gas deep into the holds of the ship. Their lives depend upon their teamwork and quick thinking. The film presents many safeguards, and clearly shows how our government shields the health of the people from foreign plague.

WE DO NOT RENT

FRITH FILMS 1816 North Highland Ave. Hollywood 28, Calif.

Earth Pictured From 101 Miles Up In 16mm on Scientific Photography

♦ The moon in motion, the blood circulation of a living brain and a picturization of the earth from 101 miles up are some of the amazing sequences in the new Navy color film, *Naval Photography in Science*. Techniques utilized to make the 28-minute film effective include stroboscopic, microscopic, macroscopic, high speed, slow motion, time lapse and underwater photography.

Another Navy film, *Antarctic Expedition*, has been released which also will interest teachers of general

science and other courses. This film gives an on-the-spot account of Antarctic exploration during the U. S. Navy's ambitious Operation Highjump. Its running time is 18 minutes.

Both films may be borrowed from your nearest Naval District Headquarters at no charge. Proper addresses for the films in the major districts are: Third Naval District, 90 Church Street, New York City 7; Twelfth Naval District, Federal Office Bldg., San Francisco 2; Ninth Naval District, U. S. Naval Training Center, Great Lakes, Illinois. Re-

quests should be addressed attention of District Public Information Officer.

Program of Selected Films

Shown at Notre Dame Anniversary

♦ Twelve hours of continuous film showings were the highlight of the second anniversary celebration on March 22 in the Department of Audio-Visual Aids at the University of Notre Dame.

The all-day program had been planned by Orville R. Foster, director of the department staff. Lasting from 8 a.m. to 8 p.m., it represented two specific aspects of the department's work, educational entertainment and full-scale motion picture production.

One film on the program, entitled *Rome, the Eternal City*, is typical of the widely diversified movie shorts which are shown three times weekly by the department as special lunchtime entertainment for students and faculty. These movies which are informative as well as interesting, cover such fields as science, travel, business and the arts.

Filmstrips to Develop Student's Ability to Speak, Read and Write

♦ Designed to aid the student in developing his ability to read, write, speak and listen, eight new filmstrips have just been released by the Society for Visual Education, Inc. The filmstrips have been prepared by Bess Sondel, Ph.D., popular lecturer, University of Chicago faculty member, and author of "Are You Telling Them?"

The series is illustrated by the SATURDAY REVIEW OF LITERATURE cartoonist Cissie Liebschutz. They present the techniques of communication in such a way as to help the student to express himself in speaking and writing.

McGraw Sponsors Five Text-Films On "Psychology in Education"

♦ A new series of five pictures to be correlated with Dr. Herbert Sorenson's book, *Psychology in Education*, are being produced for the Text-Film Division of the McGraw-Hill Book Company.

Correct Walking Comfortable Walking

PROPER STEPS

Based on medical research
9 min., sd., b&w

Write for free literature on films & filmstrips

FLORY FILMS, INC., Teaching Film Dept.
303 East 71st Street, New York 21, N.Y.

Announce "Health Adventures"
Series of Nine Discussional Slidefilms
 ♦ A series of nine discussional slidefilms, totaling 526 accurate pictures, in a *Health Adventures Series* has just been announced by The Jam Handy Organization, Detroit.

Showing students how the human body works and the *why* behind the rules of health, the films are designed to bring health closer to the child's interests; the two-part series is designed for later elementary and junior high school grades.

Distribution Outlets Noted for Fifteen French Teaching Films

♦ Fifteen French teaching films are now available for distribution by the International Film Bureau in Chicago. These films have recently been purchased by the Columbia University Educational Films in New York, which will supply with the films complete copies of the commentaries of each.

Commentaries were written by Jean Bréault of the French Ministry of Education. Printed scripts are available to teachers with vocabulary notes by a Chicago committee of the American Association of the Teachers of French.

In addition to Columbia University, Indiana University and the University of Maine are distributing the pictures. Boston University will begin rental service of the French films next September. More than fifty boards of education and universities have purchased assorted prints so far.

Film Advises Young Couples On Preparedness Before Marriage

♦ *Are You Ready for Marriage?*, a film for young couples in love, will be released by Coronet Films early this spring. The 16mm film is expected to meet a great need for such a picture and will be available for use by schools, churches, clubs, and such organizations.

The motion picture tells the story of a couple, barely under 20 years old, who after three months of going together, are eager to get married. How they check themselves as to their being prepared for the serious step is shown with interest and effectiveness in the film.

The helpfulness of marriage counseling is covered in detail and typical problems faced by the young couple will make *Are You Ready for Marriage?* a widely applicable film.

FILMS FROM BRITAIN



COLOUR

Technicolor. This film describes the nature of color and its many uses. The study of a great chemical industry shows the development of modern synthetic dyes, based on a discovery nearly one hundred years ago that color could be obtained from coal tar. Today, scientists are carrying on constant research and experiments in new dyes and pigments.

15 minutes

Rental \$5.00

ONCE UPON A TIME

This is the story of Britain's contribution to the art of clock making. Greenwich Observatory was built during the reign of Charles II; in 1764 a clock was made that would keep time for months on board ship, so the problem of longitude was solved; and today, in the era of mass-production, Britain's clock industry maintains its very high standard.

14 minutes

Rental \$2.50

EVERY DROP TO DRINK

Produced for the Metropolitan Water Board, this film shows how the Board met the problem of supplying pure water to the huge population of London. It describes the processes of purification, the pumping system which serves an area of 540 square miles, and many other details of the fascinating organization which is served by both engineers and scientists.

20 minutes

Rental \$2.50

TAKEN FOR GRANTED

The film is a comprehensive survey of the work that is done by the local authorities in Middlesex to ensure that sewage is efficiently removed from built-up areas in the interests of public health. Sequences follow the whole system of sewage removal in such a way as to make this very interesting story understandable to general audiences.

19 minutes

Rental \$2.50

FASTER THAN SOUND

Produced for the Ministry of Supply by the Crown Film Unit, this is a study of tests made to break through the sonic barrier. A miniature pilotless machine was developed to achieve this feat. Propelled by rockets and automatically controlled, the test model flies under its own power and its flight is traced by radar from the ground.

10 minutes

Rental \$1.50

TURBO-JET PROPULSION

Made with the cooperation of Rolls-Royce, Ltd., the film shows the principles of turbo-jet propulsion and the application of these principles as exemplified by the Rolls-Royce Derwent Turbo-Jet Engine. It is particularly suitable for showing to schools, technical colleges, engineering groups, flying clubs, etc.

16 minutes

Rental \$2.50

FURNIVAL AND SON

This Crown Film Unit Production is a portrait of the city of Sheffield, its great steel industry, and the people who work in it. Some are employed by huge up-to-date factories where tuffery is mass-produced. Others work in small forges which have been handed down from father to son for generations.

18 minutes

Rental \$2.50

UNIVERSITY OF FLYING

Men of all nationalities attend the Empire Test Pilot School, for it is the only school of its kind in the world. Its purpose is to make men who are already experienced pilots into test pilots, such as are needed by aircraft companies and Government research establishments.

17 minutes

Rental \$2.50

JET GETAWAY

With high-speed jet planes, it is almost impossible for a pilot to bale out unassisted. On a specially built steel tower, tests of a new "pilot ejection" seat were made. As the invention was improved, it was tried from planes, using dummies. Now the seat has been perfected and air-men are ensured of a safe method of bailing out of their planes.

8 minutes

Rental \$1.50

WONDERS OF THE DEEP

In this film the cameras are taken under water, where they have recorded remarkable sequences of marine photography. Many facets of a hidden world are investigated, including the interior of a sunken troship and the actual firing of a torpedo from a submarine. The diver no longer needs a heavy helmet, boots and a lifeline — he now wears an eye mask, fins on his feet, and breathes from bottles of compressed air.

10 minutes

Rental \$1.50



Films from Britain may be obtained on application to
BRITISH INFORMATION SERVICES
30 Rockefeller Plaza, New York 20

or from conveniently located B.I.S. or British Consulate offices in Boston, Chicago, Detroit, Houston, Los Angeles, San Francisco, Seattle and Washington, D. C.
 and from numerous educational and commercial film libraries.

To Help You Build Well-Informed Citizens



FORUM FILMS present four new releases on four vital subjects of the day.

REPORT ON THE ATOM

This new Forum Film takes your students into the laboratories and factories of the Atomic Energy Commission. It shows actual research on the peaceful uses of atomic energy, and explains how radioactive materials are now used in medicine, biology, industry.

LIFE ON THE MODERN FARM

Farm production is steadily increasing, and America's farmers are more prosperous than at any time in history—yet many of them are worried about the future. Through the life of a typical farmer your students learn about an ever-important problem in U. S. life.

SWEDEN LOOKS AHEAD

For one hundred and thirty-five years Sweden has remained neutral. But now she finds it increasingly difficult to maintain that position. In this new release your students will learn why Sweden is assuming a key position in international rivalries.



Forum Films are 16 mm. releases by THE MARCH OF TIME. Each has been specially edited for classroom use. Every Forum Film that you buy or rent comes with a discussion outline, study questions, and bibliography. For further information, mail the coupon now.

AMERICA'S TRAFFIC PROBLEM

Can our road-building keep pace with the steadily increasing number—and size—of our cars? The problem will affect your students, as future drivers, voters, taxpayers. In this new release they learn why it has developed and see some daring solutions now being studied throughout the nation.

Don't Miss

THE FIGHT FOR BETTER SCHOOLS

Here is the dramatic story of how the aroused citizens of Arlington County, Virginia, raised their schools from among the nation's poorest to a level that Dr. William A. Early, superintendent, calls "an educator's dream". This new release shows what every town can do when it becomes interested in its school problem. You may want to arrange several special showings before your local PTA, your school board, civic groups, men's and women's clubs, etc.

For further information on the new Forum Films described on this page, mail the coupon now.

MAIL THIS COUPON NOW

SH 2

The March of Time Forum Films

369 Lexington Avenue, New York 17, N.Y.

Please send me your folder on MOT Forum Films including list of available films, purchase and rental prices, and names of dealers near me.

Name _____

Position _____

Address _____

Summer Audio-Visual Courses Announced by Two Colleges

◆ Western Maryland College at Westminster, Maryland, and Occidental College at Los Angeles have announced their summer session audio-visual courses. Western Maryland will hold a three-hour course from July 24 to August 26, with Dr. Sara E. Smith instructing.

Occidental offers five audio-visual courses for its six-week session beginning June 19. They are as follows: Materials and methods in audio-

visual instruction, Audio-visual materials other than motion picture, Radio and recordings in education, the Filmstrip, and Photography for teachers.

These two announcements are preliminary to See & Hear's annual coverage of summer session audio-visual courses which will be reported in an early issue. All educational institutions offering such courses are reminded to send in their announcements to See & Hear as soon as possible, giving full details.

• NEWS AT PRESSTIME •

Dr. Herbert Jensen Appointed NEA Audio-Visual Director

◆ Dr. Herbert R. Jensen has been appointed Acting Director of the Division of Audio-Visual Instructional Services, according to announcement by Willard E. Givens, Executive Secretary of the National Educational Association. Dr. Jensen will also serve as Executive Secretary of the NEA Department of Audio-Visual Instruction which serves a nationwide membership of teachers and educators.

In his new position, Dr. Jensen will help the nation's schools and colleges make wider use of motion pictures, film strips, slides, recordings, models, graphs, charts, radio and television programs.

Dr. Jensen has been active in the audio-visual field since 1934 when he joined the staff of the Visual Education Service of the University of Minnesota. In 1938 he was named director of a national study of school experience with motion picture equipment for the Committee on Scientific Aids to Learning of the National Research Council.

In 1942 he joined the Navy Department as visual education consultant to work on a survey of the audio-visual needs of the Naval establishment. He was commissioned a Lieutenant (jg) later that year and was assigned to supervise the production of Navy training films on amphibious warfare.

In 1944 he was named head of production research in the Training Film Branch, a position he held until joining the inactive reserve in 1946 with the rank of Lieutenant Commander. Dr. Jensen then served as director of research for National Education Films, Inc., a New York film producing organization until he joined the staff of Teachers College, Columbia University. While completing his graduate work there, he organized the Communication Materials Center at Columbia. He also served as manager of Columbia University Educational Films.

Dr. Jensen was born in Sleepy Eye, Minn., in 1910. He holds a BBA and a MA degree from the University of Minnesota and the degree of Doctor of Education from Columbia University's Teachers College. Dr. Jensen is married and has two children.

American Museum Announces Annual School-Made Film Contest

◆ The American Museum of Natural History recently began its long-range plans for the fifth annual national contest for the best school-made motion picture film. The competition is open each year to all students of junior and senior high schools in the United States.

An "Oscar" was awarded last January by the Museum to the students of George Washington High School in New York for their *Animal Antics* film. Entries were received from numerous high schools in the national contest.

Entries for the next contest on January 5 and 6, 1951, must be filled out and returned to the Museum by May 15.

16mm on Improving Schools Made Available at Half Cost by NEA

◆ *The Fight for Better Schools*, the effective March of Time documentary which encourages citizen action for school improvement, will be available for rental at half price until December 31 to educational institutions. Arrangement for the rental reduction was made by the National Education Association in its effort to promote interests of education.

The film follows the steps taken by Arlington, Virginia, voters in installing a new board of education which would be more sensitive to needs of the children. Response to the 16mm has so far been very good. Order blanks may be obtained by writing to the N.E.A., 1201 Sixteenth Street, N.W., Washington 6, D.C.

Natl. Institute of Mental Health Begins Psychiatric Film Series

◆ *Preface To a Life*, the first in a series of psychiatric films planned by the National Institute of Mental Health, has just been completed. Produced by Sun Dial Films, Inc., in New York, the picture will be premiered during National Health Week in April.

The film is intended as a general introduction to the subject of mental health and deals particularly with the role of environment in mental development. Columbia University psychology professor, Dr. M. Ralph Kaufman, who served as consultant on *The Snake Pit* production, also served in that capacity in *Preface To a Life*.

"SCIENCE VISUALIZED"

The Audio-Visual News Letter

NOTES AND COMMENT ON PERSONALITIES AND EVENTS

Revitalized Department of Audio-Visual Instruction Presents a Challenging Program at Atlantic City Convention

★ THE SETTING was the all-too-familiar scene of Atlantic City's hotel meeting rooms and the bustle of the traditional convention hall trade show. The participants, for the most part, had been there and at similar

and Leila Trolinger, DAVI vice-presidents; of Roger Albright, Harold C. Bauer, Floyd E. Brooker, and J. Margaret Carter set up a broad program of meeting topics. Host state representatives of the New Jersey Visual Education Association included E. Winifred Crawford, Mrs. Margaret J. Burt, and Edward Schofield, president of the Educational Film Library Association and head of Newark's sizable and active Bureau of Visual Aids and Radio.

Most challenging program of the week was the meeting of February 28 at which state, county, city, and college administrators quizzed a representative panel of audio-visual directors; and the timely debates on three subjects of intense professional interest to the field. These were:

1. State film library distribution to schools on a free loan basis. The question: is this free film distribution desirable in terms of the long-range growth and development of the field?
2. Requiring teachers to take a course or acquire in-service experience in audio-visual methods and materials as a requisite for a state teaching credential. The question: is such a requirement the most desirable and best way of solving this problem?
3. The broadening of service by city, county, and state audio-visual education departments to include *all* instructional materials with a Director of Instructional Materials in charge. The question: Is this sound and to the best interests of instruction?

Affirmative answers, with some-
(CONTINUED ON THE NEXT PAGE)



DAVI'S FRANCIS NOEL

gatherings before. But a new vigor and hard-hitting realism pervaded this year's annual conclave of the Department of Audio-Visual Instruction, the National Education Association section dedicated to the professional interests of this phase of educational methods.

Under the presidency of California's state audio-visual bureau chief Francis W. Noel, a new DAVI spirit of self-analysis and coordination apparently emerged during the well-attended four day conference sessions at Chalfonte-Haddon Hall from February 27-March 2. The active participation of conference planning committee members James W. Brown

Right: a between-meetings glimpse at DAVI sessions as Sherwin Swartout, research assistant, chats with Dr. Edgar Dale, Bureau of Educational Research director, Ohio State University.





DAVI members and guests: above left (l to r) Margaret Carter, National Film Board of Canada; Chester Lindstrom, Motion Picture Chief, U. S. Department of Agriculture; Abraham Krasker, a-v director at Boston University; Ray E. Blackwell, Associate Director, International Film Foundation; and Ray Wyman, University of Massachusetts. Below, left: (l to r) Joseph E. Johnson of the Arlington, Virginia Schools; Kern Moyse (center) president of the Peerless Film Processing Corporation; and W. H. Durr, Virginia State Department of Education.

More DAVI delegates between sessions: above, right (l to r) are Godfrey Elliott, vice-president, Young America Films, Inc.; J. S. Kinder, Director of Film Service, Pennsylvania College for Women; and Fred Powney, assistant director of sales, Young America Films, Inc. Below, right (l to r) are two recent Japanese educational authorities including T. Suzuki, consultant to the Tokyo Board of Education; and Kyoichi Ochiai, also a Tokyo board consultant visiting U.S. schools. With them is John R. McCrory.

ANNUAL DAVI SESSIONS

(CONTINUED FROM PRECEDING PAGE)

what less than the traditional reserve exhibited by educators, seemed predominant in the last two areas with considerable less accord on free film distribution by state libraries. Recognizing that the few states in which this has now developed are largely in a transition period of development, delegates felt that the early establishment of self-sufficient city and county audio-visual libraries was the eventual and necessary goal.

Other interesting sessions included a dinner address by U. S. Commissioner of Education Earl James McGrath on "Our Challenge and Responsibility for Developing Standards of Teacher Competency in Audio-Visual Education"; "Developments in the Armed Forces" a report by Allan C. Finstad, assistant director, Training Aids Division, Bureau

of Personnel, Navy Department; and "Newer Approaches to the Development of Understanding of How Life Begins" a film demonstration and talk by Lester F. Beck of the University of Oregon.

Below: "Ward Bowen, Audio-Visual Director, State of New York



BEHIND THE HEADLINES

◆ Science film users will be especially interested in the numerous film guides available from the College Entrance Book Company, New York, to accompany many of the widely sound classroom films. A-V educators Paul R. Wendt, A. W. VanderMeer, and Myron F. Boyer are among the collaborators.

◆ Especially valuable for the social studies are recent classroom films produced and distributed by one of the few outstanding women in the audio-visual production field, notably Emily Frith of Frith Films. Authentic and interesting, Frith productions have wide acceptance among schools throughout the U. S.

◆ A new series of special monographs on important technical and professional aspects of audio-visual methods and materials is being published by the Society of Visual Education.

Michigan Looks to the Future

at Fifth Annual State Audio-Visual Conference

TYPICAL of the growing statewide consciousness of audio-visual methods and materials was the recent fifth annual Michigan Audio-Visual Conference held at the University of Michigan. The combined sponsorship of the audio-visual education committee of the Michigan Department of Public Instruction, Secondary School Association, Elementary School Principals, School Administrators, Congress of Parents and Teachers, School Board Members and the Association for Supervision and Curriculum Development set a noteworthy example of cooperation.

From the opening session under the chairmanship of Wilfred Clapp, deputy superintendent of public instruction, through a day of administrator reports and discussion groups, delegates from all sections of the state were given practical aid toward improving current utilization as well as sound advice on beginning audio-visual programs. Featured speakers were Dr. James B. Edmonson, dean of the School of Education at Michigan and Floyd E. Brooker, chief, visual aids section of the U. S. Office of Education.

A number of well-prepared commercial exhibits were displayed in

the Art Galleries of the Horace H. Rackman School of Graduate Studies where the conference was held. Late models of audio-visual equipment and special previews of new materials were presented for the visiting educators at the Audio-Visual Center.



WILFRED CLAPP, deputy superintendent of public instruction, addresses Michigan audio-visual conference.

Among the superintendents participating were Carroll C. Crawford (Holland); James Lewis (Dearborn); Loy Norrix (Kalamazoo); William H. Taylor (Vicksburg Community); and Russell West (Ann Arbor).

Filmstrip "Bargains" Indicate Need for Critical Standards

★ **SOUND ADVICE** to educational users of filmstrips or "slidefilms" is to look twice before you leap at current bargains being offered. Through a notable lack of critical standards by which the schools can judge these highly useful tools, we hear of flagrant examples of content inaccuracy, "wild" color, and an apparent tendency in some quarters to consider the filmstrip as an assemblage of unrelated still pictures.

We must begin to evaluate filmstrips on the same critical basis as other classroom materials. *Good* filmstrips begin with the same kind of authoritative preparation and thorough checking of facts as a good textbook; *the orderly, correlated presentation of those facts and their progressive disclosure requires skill and experience.* It also requires integrity.

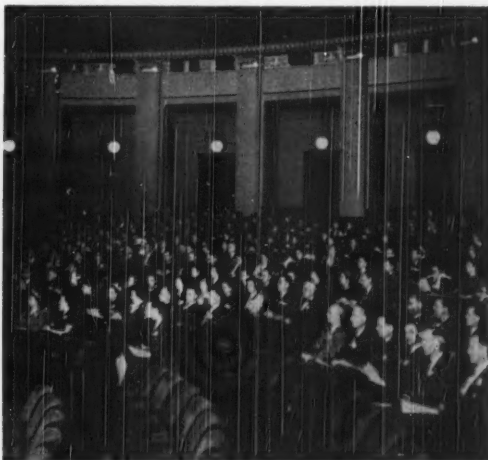
When color is required, its cost and use are justified only by *absolute fidelity* in every detail. Finally, subject matter must bear some useful relationship to the course of study. Schools should preview all new filmstrips on the basis of these criteria.

A convenient and permanent library of filmstrip is within the means of most fair-sized schools (or rural districts). But such libraries should contain materials of unquestioned accuracy and of lasting value.

Conference delegates heard a featured address by Floyd E. Brooker, visual aids chief for the U. S. Office of Education.



Michigan educators assembled in the Horace Rackman memorial amphitheater for fifth annual a-v conference meetings.





Above: high voltage radiation apparatus research.

Inspiring Message to Science Students—

"CHALLENGE Science Against Cancer"

"...a steady unheroic search for a shaft of light. And the light may come from any work, from the study of an animal or a plant root, for cancer is common to all living things. It is the answer to life for which the students of science are searching, and the problem is great. But in the end, the answer will come."

—from "Challenge — Science Against Cancer"

TODAY, cancer is a major problem of science. Its secret is the secret of the cell, the basic unit of life. Its conquest and control will be one of mankind's greatest victories over death and pain.

An important new visual interpretation of that problem and an inspiring message to all young students of science is the new internationally-sponsored 30-minute documentary motion picture *Challenge — Science Against Cancer*. Sponsored jointly by the National Cancer Institute of the U. S. Public Health Service, Federal Security Agency, and the Canadian Department of National Health and Welfare, *Challenge* was premiered last month at Hunter College Auditorium, New York city, before an audience of 2,600 scientists, physicians, health officials, and other guests. A midwest premiere under the joint sponsorship of the Chicago Film Council and the Chicago Public Library was held in that city on March 21.

The film, which is already available in a 16mm sound version, visualizes today's cancer problem as a scattered jigsaw puzzle, with important parts missing. Many essential pieces, including the most vital secrets of

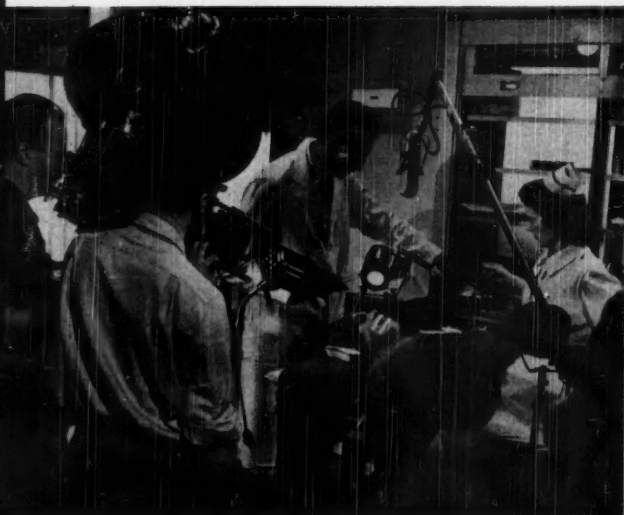
cancer, are contained in every living cell, according to the film. In dramatic animation sequences, the film expands the cell to giant size, and by means of the camera draws the spectator into its living interior, so that he may observe the cell breathing, digesting food, reproducing, and undergoing other chemical and physical changes that occur in normal and cancer cells.

The film also shows how cancer is diagnosed by examination of cells under the microscope, and treated by surgery, X-ray, or radium. Supplementary materials include a filmstrip and accompanying reading script; 112-page booklet; and a teacher's guide. The 30-minute sound film print may be purchased at \$45 from the Medical Film Institute, 2 East 103rd Street, New York city; the filmstrip and text cost \$2.00.

The film was produced by the National Film Board of Canada and the Medical Film Institute of the Association of American Medical Colleges. International sponsorship is by the United Nations Film Board and the World Health Organization who are encouraging distribution of versions with foreign language sound tracks. Cancer knows no boundaries. ●

Filming the treatment of cancer of the lower lip. Radium needles are being inserted into the cancer tissue.

This scene from "Challenge" shows the use of X-ray therapy to cure cancer of the skin.



Science Looks to the Screen

by Nathan A. Neal

President, The National Science Teachers Association

SCIENCE IN OUR SCHOOLS consists largely of the study and explanation of phenomena, either directly or indirectly observable. Since the collection of facts through observation is a step in the method of study used in science, it follows that any device for expanding the range and speed of students' observation is a most valuable aid in teaching science. Films and filmstrips do have that capacity. They can sharpen students' perception to a point far beyond normal physiological limits; they can present a process that cannot be seen by the human eye even with the aid of microscopes and telescopes; and they can take students "on a magic carpet" to witness, under the most favorable conditions, demonstrations and exhibitions of all kinds of phenomena anywhere in the world. In addition, films and filmstrips can help students to visualize theoretical concepts, thereby speeding up their learning.

Although the potential values of audio-visual materials are fairly well recognized, it appears that their utilization in science teaching is still far below maximum potential. Budget limitations and lack of proper facilities are no doubt responsible for much of this deficiency. On the other hand, there are undoubtedly many teachers who are held back in the field by obstacles which they, themselves, could do much to eliminate.

These obstacles, arising generally from inexperience, are most frequently described as follows:

1. Don't know what films are available.
2. Don't know how to go about choosing suitable films.

3. Aren't sure how to use films effectively in teaching.

With the ever-growing scope and requirements of our science curricula, it behooves us, in justice to ourselves as well as to our students, to analyze these obstacles and to eliminate them if we can.

1. The Availability of Films

In many schools and school systems today some one person has been given the responsibility of coordinating information on and utilization of visual materials. Valuable time and effort can often be saved by consulting with these coordinators in planning a visual program. In addition, however, the science teacher will find other valuable sources of information on what films are available.

There are many excellent film catalogs. Among the most important to the school science teacher are the catalogs of the state film libraries from which schools



National Film Board of Canada

obtain most classroom films. Information on these can be obtained from your state university or state department of education. The American Chemical Society has a catalog on "Films on Chemical Subjects". Catalogs can also be obtained from various producers. Thousands of films are listed in these references.

2. Evaluation and Selection of Films

There are so many films available that it becomes a problem to decide which to select, even within a narrow subject range. Very few teachers can find much time to look at a number of different films and make careful selection. But this problem need not be an obstacle to the use of films, either. There are several excellent sources of evaluation information on films. Many of the audio-visual magazines carry reviews and evaluations of new films, prepared by leading educators in the specific fields covered by the films. The Educational Film Library Association supplies printed film evaluations on 3 x 5 cards which can be filed for convenient reference. These reviews have been prepared by leading educators both in public schools and universities. Information about availability of this material can be obtained by writing to the Educational Film Library Association, 1600 Broadway, New York.

These evaluation services can save a teacher consider-

Science Looks to the Screen:

(CONTINUED FROM THE PRECEDING PAGE)

able time, but they should not be depended upon entirely in the selection of films. Many teachers will want to follow the recommended practice of previewing a film before final decision on using it in the classroom. This decision will be based on many criteria, of which the following are perhaps most important:

- a. Does the film present material that will effectively help your students in their understanding of the subject?
- b. Is the subject matter scientifically accurate, and is it interestingly and efficiently presented?
- c. Does the film closely correlate with the textbook being used and with the way you, the teacher, present the subject to your classes?

3. Effective Utilization of Films

The best constructed teaching film can be rendered practically valueless through ineffective utilization. Perhaps the teacher has more direct control over the educational value of audio-visual materials than over any other teaching aid. For this reason, film utilization is constantly getting more and more emphasis in both pre-service and in-service teacher training programs. It is a subject with too many facets for any detailed discussion here, but one aspect, above all, should be given due emphasis: the importance of using films in accordance with a carefully worked out plan. Details of such a plan must naturally be varied to meet individual needs, but the principal points have been clearly defined by experts in audio-visual education, to whom we can profitably turn for guidance.

Any teacher using films or filmstrips should follow a procedure somewhat as follows:

- a. Select films carefully.
 - b. Preview the film before showing it to the class. If a teacher's guide is supplied, read it carefully. These guides contain valuable suggestions on effective utilization.
 - c. Determine precisely the most effective day on which to show the film, when it will best reinforce the lesson material. (This is admittedly complicated by film rental requirements.)
 - d. Prepare the class with introductory remarks on things to look for, particularly those parts of the film that tie in closely with text material, previous classroom discussions, laboratory work, field trips, and other learning activities.
 - e. Show the film. If it is a silent filmstrip:
 - (1) Read the captions aloud, or ask one of the students to do so.
 - (2) Add supplementary remarks freely, or ask questions of the students about what they see on the screen.
 - f. Immediately after the showing, follow up with some activity that will help to reinforce the film's important points, preferably a type that involves student participation. This can be a quiz, a question-and-answer session, a panel discussion, or brief comments by individual students. In some instances, a second showing of the film may be worthwhile.
 - g. In subsequent meetings of the class, relate back as much as possible to the film.
- Visual materials offer the science teacher an opportunity to stimulate objective thinking and to make science teaching more meaningful in terms of modern living outside the classroom. •

"Visualizing" a Science Classroom

by Melba Moore, Emerson Junior High School, Los Angeles

THERE IS NO SCHOOL SUBJECT that lends itself more effectively to the use of audio-visual materials than does science. Any teacher who has discovered the keen interest that can be developed in the subject and the effective learning that takes place with the proper use of audio-visual materials will not be satisfied to teach without them. Upon visiting a classroom displaying the wide use of such aids, a teacher is apt to feel that the ideas are good but that the time and energy required to prepare such materials will not be commensurate with the returns. For one who is just beginning the teaching of science, or for one who has just moved into a new room, the job is tremendous; but there are always ways of lessening the burden on the teacher by the use of student help and by the careful organization of materials and data. Pupils enjoy helping the teacher build a library of materials and much effective learning can be the outcome of such experi-

ences. Cataloging of materials and organized storage of equipment save time in finding needed things quickly and in preserving them for future use.

The variety of audio-visual aids usable in the teaching of science is practically limitless. The school systems that have sound film and transcription libraries are fortunate indeed; but one should not think that visual aids in the classroom end here. Certainly motion pictures bring to the children understandings that would be very difficult to develop otherwise. For example, the use of time lapse photography can demonstrate to students in a few minutes actions that normally take days or weeks to occur. Locations that are impossible for the group to visit can be brought into the classroom by the use of films. Transcriptions, radio, television, wire or tape recordings, etc., provide for the teacher dynamic means of putting over ideas. But, there are still many other splendid aids available to the ingenious, energetic

instructor that do not require expensive equipment.

Neat and artistic bulletin boards prepared by students can do much to enhance the beauty of a room and at the same time they may be used as teaching tools. The pictures or charts displayed on the bulletin boards may be circulated about the room in celluloid covers for more detailed study, and yet be saved for use year after year. Many current magazines are good sources of pictures and charts, and many worthwhile materials may be obtained from government agencies and private concerns.

An alert teacher will encourage the students to bring to class specimens such as rocks, fossils, soil samples, insects, plants, etc., where they may be observed by the class and then preserved for future classes to use. These in turn make interesting cupboard or shelf displays when not otherwise in use.

Living Specimens Stimulate Pupil Interest

The teacher of life science can do much to stimulate interest in the subject as well as to provide valuable learning experiences through the display of living specimens in the classroom. Animals require cages, and if the shop classes cannot build them, with proper instruction and encouragement the science students can prepare adequate ones. Examples of some simple home-made cages are shown in the illustration.

Although many instructors enjoy week-end excursions to gather living specimens for themselves, properly trained and stimulated pupils often provide a teacher with more living materials than can be used. Proper attitudes and a sense of responsibility may be developed in children by requiring that they care for these living things.

If no living specimens are available other than fish and water plants, a well balanced aquarium is an asset to any science room. It may be used to teach important ideas, such as the carbon-dioxide-oxygen cycle and other important relationships between plants and animals. Potted plants can be objects of beauty and also may be used for the study of growing plants.

Simply having properly cared for living specimens in the classroom that will interest and intrigue the children

is not enough in itself. The effective use of these things as teaching aids is necessary also. Since many science teachers shy away from the use of living animals in the classroom, examples of how they may be used to aid the instructor in teaching will be discussed at this point.

Familiarity Can Also Build Confidence

An animal as easily obtained and cared for as a tame snake may help the teacher in developing a variety of important ideas. The frightened child may be taught to handle the snake and discover for himself how foolish were his fears. By careful study and observation the pupils may be led to see how absurd are the many superstitious beliefs about snakes, and this in turn should help the students to learn to seek facts.

The careful study of a snake may lead the class to discover how it is protected from its enemies by protective markings and colorings. This may be carried even farther to show the class how the snake came to be marked and colored as it is. Very easily from this point of direct interest in the snake, these same ideas may be widened to include other animals and even plants.

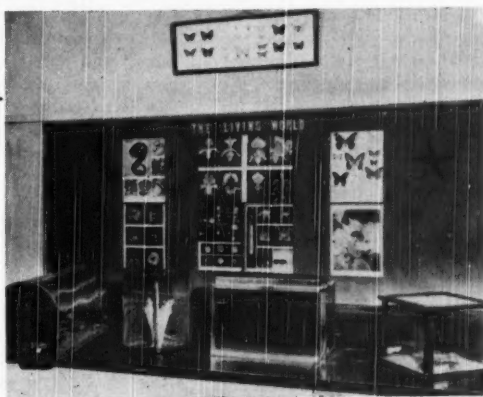
The fact that this reptile becomes sluggish and inactive when cold should illicit questions from the pupils that can lead directly to the understanding of the meaning of animals being cold or warm blooded. This may in turn open the door for more understanding about the functioning of the child's own body. An understanding of balance in nature is made simple by learning what the snake eats; and the pupils can be led to understand that all living things hold their particular place of importance in the world.

Useful First Lessons in Reproduction

Reproduction, a significant and yet often difficult subject for the teacher, is made real and understandable by class observations of the bearing and rearing of young by small animals in the classroom. Here the snake ceases to be as usable as some types of rodents and insects.

Almost any living animal may be used to teach a variety of things, such as those just mentioned, but not

A museum of our own in the science classroom helps provide many useful learning experiences with comparatively simple facilities.



Picture courtesy
of the
Los Angeles
City Schools

(CONTINUED FROM THE PRECEDING PAGE)

all animals lend themselves well to being caged in a classroom. Some kinds most easily used are harmless reptiles, rodents such as rats or hamsters, invertebrates such as caterpillars, grasshoppers, spiders, scorpions, and many salt water specimens. Just in passing, it is of interest to mention the outstanding value of a salt water aquarium for those who live near the ocean. Such an aquarium requires special care and equipment; but the possibilities for interesting and effective teaching are tremendous. Persons who have successfully taught science with the use of living specimens realize the great advantage they have over the preserved materials and pictures. The extra care required to keep them in the classroom is more than compensated for by the interest and learning provided the children.

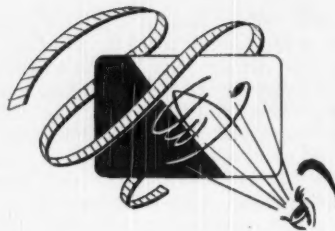
Make the Most of Your Demonstrations

The use of scientific apparatus in the teaching of many important ideas such as distillation, electrolysis, internal combustion, and steam engine, etc., are extremely valuable in the teaching of some phases of science. Student participation in demonstrations involving such apparatus is often possible and worthwhile since one learns best by doing. The teacher who does not have these aids available is handicapped but can frequently substitute home-made equipment or accurate drawings made on large sheets of heavy paper or on the blackboard. Chalk carefully used on the blackboard is one of the teacher's greatest visual aids. Handmade lantern slides projected on a screen are often valuable and helpful. Simple illustrations frequently clarify meanings in science where words are inadequate. Accuracy and neatness are always desirable in such work.

Planning Will Help You Get Results

Not all of the audio-visual aids directly usable in the science classroom have been discussed here. The creative, ingenious teacher is constantly developing and seeking new aids in teaching. However, it is wise to remember that no matter how well equipped a school may be with such aids, unless the teacher uses them effectively they may lose much of their value. As an example, the motion picture is often misused in the teaching of science because the students are not adequately prepared for what they are going to see and hear. Of necessity science films often cover a wide scope of ideas. The vocabulary is frequently new and difficult for the pupil. Unless the teacher prepares the class for these things, little learning may take place and even misconceptions may result. As with any teaching, a good follow-up is necessary to guarantee real learning.

Science teachers need to remember that neatness and orderliness are necessary if one is to be scientific; and the teacher who fills the classroom so full of visual aids that they become a hodgepodge is not providing a good example for the children. A place is needed where materials not related to the work at hand may be stored in order that new things, appearing for the class to observe and use as the subject matter changes, may be displayed. In such a manner the classroom becomes a dynamic, interesting place to the students rather than a static museum. ●



Science Teachers in Training

THEY WILL USE THE AUDIO-VISUAL TECHNIQUE — AS THEY ARE TAUGHT

by Milton O. Pella

The University of Wisconsin

THE TRAINING OF SCIENCE TEACHERS involves, to no small degree, the use of audio-visual materials as well as developing the ability to use them. Basic to the use of these materials is a sound philosophy in their employment. This philosophy must be tied directly to a sound philosophy of science teaching.

The visual materials in science involve the use of pupil experiments, demonstrations, field trips, models, objects, pictures, charts, filmstrips, silent and sound motion pictures, sketches on the blackboard, telescopes and microscopes. The success of a beginning science course is to be found in the appropriate use of these instructional materials and techniques. *No one is given sole virtue over the other. All are to be used.*

The study of science deals with the "what," "how," and "why" of objects and situations. The "what" and "how" are observable or discernible by man through the use of the real thing or depictions of the real thing. The "why" of science is philosophic in nature and so finds its source in the imaginative mind of man. The "what" and "how" are observed, and on the basis of these a "why" is developed if possible.

In the development of any understanding in science, a good teacher begins with a concrete experience and later provides vicarious experiences based upon the original experience. The real experiences are gained through the use of the several senses. A great portion of these experiences comes through seeing, but seeing alone is often of little value. This experience may be accompanied by a feeling, tasting, or smelling experience. Added to this is often some type of discussion. The observed facts are then tabulated and conclusions or generalizations formulated.

In the study of an object, or structure, the question arises, "What type of experience will do the best job,

and can it be provided?" It is well to begin with the real thing whenever possible; second best is a model (providing it is big enough for all to see) of the real thing; third in line is a picture; and last and poorest is a description to the pupils by the teacher.

After the object, or structure, has been experienced and vocabulary development has begun, the question of the function, or operation, of the structure appears. Again if the real thing will do the job best, use it. For example: In the study of the structure of the leaf, the real materials are best. Pupils may examine the epidermis as well as the cross section of the leaf with a microscope. The function of the leaves in the process of photosynthesis can be observed only indirectly. A motion picture like *The Gift of Green* is valuable in showing this process. When studying Boyle's law the real apparatus is best; however, the molecular theory is best developed through the use of a motion picture like *The Molecular Theory of Matter*.

Instructional Aids We Use — and Abuse

The most commonly used and abused visual instructional aids in science are the individual laboratory experiment, the demonstration, the field trip and the motion picture. The laboratory is used as a means of developing skills, to verify facts, to solve problems, to discover relationships and to develop the ability to use the controlled experiment. The laboratory is not a place where the pupils prove the validity of the teachers statements or the content of the textbook.

The demonstration may be similarly used. The choice of the demonstration over the individual laboratory activity is dependent upon many factors, namely: the availability of space and equipment, the dangers involved, the cost of equipment, and special techniques or skills involved. A good demonstration does some teaching. The teacher does not do the telling and describing; in fact, he may not even do the demonstrating. The pupils do the observing, gathering of data, and the telling, even to the description of the apparatus. The teacher may perform the demonstration without saying a word. It should be understood that the pupils must know the purpose of the demonstration or experiment before viewing or performing it and that laboratory work and demonstrations should not be of the cookbook variety.

The field trip appears to be losing popularity. In

planning a field trip the teacher should first take the trip himself. This will give assurance that it is valuable and helpful. A field trip should not be too long and involved. Two short trips with a class are often more valuable than one long one. If the trip is to be to a museum, it is poor practice to try to see the whole museum in one trip. Do not take a field trip just to go for a walk—make it purposeful.

Steps in Planning Your Film Program

The motion picture and filmstrip are probably more abused than any other aids. Both of these are valuable only if used properly. In planning to use either of these, the teacher should preview the film first of all. The titles are often misleading. The teacher should know the content of the film. He should know at what academic level it begins. What knowledge is prerequisite for intelligent viewing of the film? What vocabulary problems are involved? What do you want to emphasize in the film?

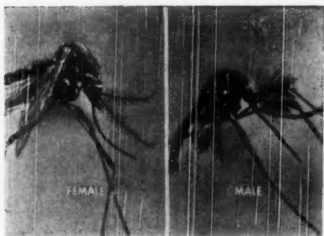
After he knows the content of the film and that he wishes to use it, the next thing is to use it at the strategic time. The film may be used to introduce a field of study, it may be used to develop an understanding of certain concepts or principles, it may be used to illustrate the application of certain science principles, or it may be used to show a process.

Students Are Prepared for the Showing

Before presenting this well chosen film at the strategic time, the pupils must be prepared to view it. Just saying, "Today we will see a movie on sulphur," is not enough. Pupils are to be given hints or pointers concerning what to look for. This may be done orally or in writing. When the pupils have reached the academic level necessary for viewing the well chosen film, show it.

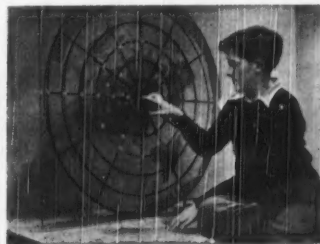
After the viewing of the film, a discussion or written exercise may follow. This is a part of your evaluation. Did it do the job? It may be necessary to show it again. This second showing might even be without benefit of the sound. Another written exercise or discussion will follow. If the film has been properly used, it has done its job.

The use of the filmstrip is somewhat different. The teacher may carry on a discussion with the pupils as it is being used. If a recording is used with the film-



Camera clarity shows the "Life Cycle of the Mosquito" (Young America)

A scene in the classroom film "Water Cycle" (produced by E. B. Films).



Learning about "The Global Concept in Maps" in the film. (Coronet)



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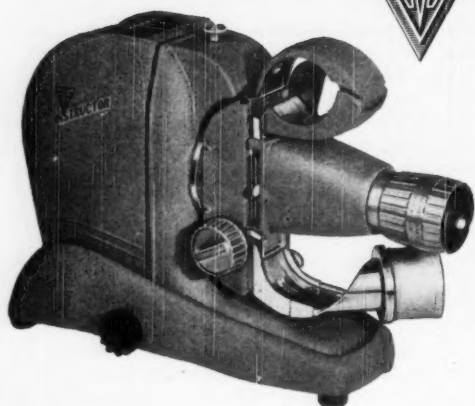
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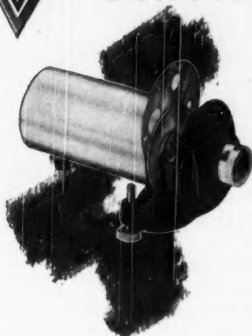


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Science Teachers in Training:

(CONTINUED FROM THE PRECEDING PAGE 21)
strip, it would be used in a manner similar to that of the motion picture.

The use of films in the training of teachers is most valuable. Motion pictures are used to illustrate methods or techniques of teaching. The film *Science and Superstition*, designed for classroom use, is helpful in showing students a method of teaching. The film *Human Growth* is also helpful in showing students how to use a film.

Pupil Stimulation Is the Basic Objective

Visual aids are to be a supplementary device or an aid to learning. They are not a method of teaching. They should stimulate pupil activity. They should stimulate interest and add meaning to words and symbols.

The effectiveness of visual materials depends upon how closely they approach reality. Animation in science at an early level may reduce its instructional effectiveness. The pupils may be more interested in the animated figures than in what they are to illustrate. This animation is a form of anthropomorphism and may interfere with the effectiveness of the film.

Preparation Is Your Key to Learning

The fact that pupils have performed an experiment or viewed a demonstration, objects on a field trip, a movie, or a film strip is no guarantee that learning has resulted. The aids must be properly chosen and wisely used. The day a movie is used in class is not the teacher's day off. It is not the day the pupils are entertained. **It is the day the teacher has planned for and prepared for in advance.**

In choosing aids to learning, it may be wise to consider the following statement. Don't tell the pupil what you can show him in pictorial form, don't use pictures for anything you can demonstrate, and don't demonstrate anything the pupil can find out for himself.

The following are films which I have used, with

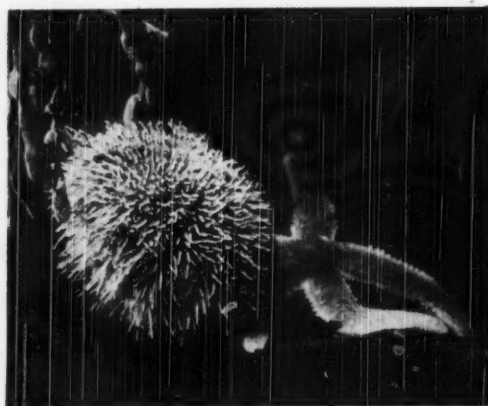
success, as I have instructed teachers in training in the field of science education:

1. *Camouflage In Nature Through Form and Color Matching* (10 min.) Color. Coronet.
2. *Cancer, the Traitor Within* (10 min.) Color. American Cancer Association.
3. *The Cell, Structural Unit of Life* (10 min.) B&W. Coronet.
4. *Diesel Engine* (26 min.) Sound. B&W. U.S.O.E. (Castle).
5. *Earth and Its Seasons* (11 min.) B&W. Knowledge Builders.
6. *Earth In Motion* (11 min.) B&W. EBFilms.
7. *Earth - Rotation and Revolution* (11 min.) B&W. EPS.
8. *Electrons On Parade* (20 min.) B&W. RCA.
9. *Forests and Conservation* (16 min.) Color. Coronet.
10. *Green Plant* (15 min.) B&W. EBFilms.
11. *Introduction to Electricity* (10 min.) B&W. Coronet.
12. *Light Waves and Their Uses* (10 min.) B&W. EBFilms.
13. *Mammals of the Rocky Mountains* (10 min.) B&W. Coronet.
14. *Molecular Theory of Matter* (10 min.) B&W. EBFilms.
15. *Nature of Color* (10 min.) Color. Coronet.
16. *Oxidation and Reduction* (11 min.) B&W. EBFilms.
17. *Principles of Flight* (11 min.) B&W. EBFilms.
18. *Reproduction Among Mammals* (11 min.) B&W. EBFilms.
19. *Roots of Plants* (11 min.) B&W. EBFilms.
20. *Salt From the Earth* (10 min.) B&W. EBFilms.
21. *Science and Superstition* (10 min.) B&W. Coronet.
22. *Seed Dispersal* (10 min.) B&W. EBFilms.
23. *Story of Dr. Jenner* (10 min.) Teaching Films, Inc.
24. *Story of Louis Pasteur* (10 min.) Teaching Films, Inc.
25. *Sulphur* (20 min.) Color. U.S. Bureau of Mines.
26. *Trees for Tomorrow* (18 min.) B&W. American Forest Products Industries.
27. *Water Cycle* (10 min.) B&W. EBFilms.
28. *Work of Running Water* (10 min.) B&W. EBFilms.

Scene in "Microscope and Its Use" (Young America)



A scene in "The Sea Urchin" (United World Films)



New A-V Horizons for the Science Teacher

by Charles R. Crakes

Audio-Visual Editor, The Science Teacher

WHAT SUBJECT MATTER AREA is, at present, best supplied with audio-visual teaching material? What single group of teachers is making most effective use of audio-visual teaching material? These two questions have invariably been asked by one or more educators at each of the several hundred educational conferences and workshops in which the writer has participated during the past six years.

In answer to these questions, I believe that the science teachers of America are now, and have been, making the most effective use of all types of audio-visual aids. Furthermore, in this subject matter area, we find the most extensive supply of good teaching materials. This trend is still very apparent throughout the United States and Canada. Here are some considerations worth noting:

(1) The science field has materials very definitely correlated with specific discussion topics. Let us qualify that statement by adding that science teachers in many school systems visited still have plenty of opportunity to improve their techniques in utilizing the splendid materials available for their use.

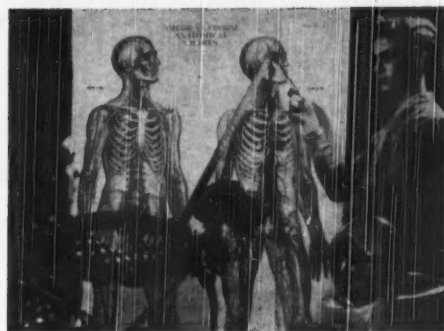
There is a growing recognition on the part of motion picture and filmstrip producers of the need for more materials to meet specific requirements in science education. For example, in the field of health education, we find many excellent new films and still pictures on such specific topics as the throat, feet, hands, lungs, heart, digestion, skin, ears, eyes, etc. I specifically refer to a recent edition of SEE & HEAR entitled "Audio-Visual Resources for Health and Welfare." (October, 1949)

Textbook Correlation An Important Factor

We find the producer working in close cooperation with science teachers in producing truly classroom teaching materials — each teaching material being rather narrow in content, but covering a specific unit or discussion topic on a broad area of subject matter. This same observation also applies to producers of films and filmstrips in the other biological and physical sciences.

(2) A second factor gaining favor with classroom teachers is the production of audio-visual materials correlated with science textbooks. At least two publishers of such textbooks are expanding their efforts along this line. I believe that in the months ahead we will see further expansion of this effort on the part of science textbook publishers, not only to produce printed materials, but also to correlate audio-visual materials. The trend is definitely in the direction of making words more meaningful to the science student.

We also note an increasing number of science text-



books which include, at the end of each chapter, a list of correlated films and filmstrips. We find that many science teachers plan their year's work to include the rental or purchase of many of these suggested materials.

In the realm of sex education, a number of new and excellent films and filmstrips are available to teachers for use at junior and senior high school level. It has been my pleasure to use some of these films in a number of conferences and the reaction of individuals assembled has been most favorable.

The impersonal sex education film can and does put over a message which many teachers may find difficult to discuss with their students. I believe that within a short time, we will have a substantial increase in the number of films in the field of personal hygiene.

Films Plentiful — If You Know Where and How

In the comparatively new fields of atomic energy and television, we find a number of films already available to assist teachers in clarifying these rather complicated and intricate scientific developments.

Industry has made available to science teachers some outstanding films in the areas of transmission of speech, production and distribution of electrical energy, production and utilization of various chemicals and also synthetics.

In the field of agriculture, we find an ever-growing number of films and filmstrips on soils, fertilizers, development of new strains of plants, diseases of both plants and animals, farm sanitation, etc. Rural teachers are finding these aids of tremendous value in improving living conditions in rural America.

What films and filmstrips are available and what are the nearby sources of supply? This problem now seems to be foremost in the minds of science teachers on all grade and subject matter levels. The writer believes the task undertaken by the publisher of SEE & HEAR magazine to compile, under appropriate subject matter headings, all films available in that field will be most welcome to science teachers. At present this problem seems well on the way to being solved through such listings of science materials.

The writer highly recommends this selected list of science films; through their intelligent use science can become more interesting, clear, meaningful and vitalizing to the youth and adults of America. ●

OUR CHANGING WORLD OF SCIENCE NEEDS NEW TOOLS FOR THE CLASSROOM

by Archie J. MacLean

Supervisor, Science Section of the Curriculum Division, Los Angeles City Schools

SCIENCE INSTRUCTION, as other things, is undergoing change. Science knowledge is no longer just for the research specialist, the physician, the chemist, or physicist, but is necessary to everyone in his daily living. Every newspaper in the country carries some item about science in every issue — from the small country newspaper with its weather reports and syndicated science articles, to the big metropolitan daily with feature articles on interviews with the leading atomic scientists. Today's world is recognized by all as being in the scientific age. Consequently, it is important that our schools give a prominent place to science instruction, and make available up-to-date materials.

With the broadening of science instruction comes a change also in the methods of instruction and a need for new materials. Science teachers have been forerunners in the use of visual materials over the years. *However, with this newer emphasis to bring about greater literacy in science knowledge for everyone, use of visual materials is mandatory.*

Science instruction can no longer lean on the lecture-demonstration method of instruction. The whole audio-visual field from study pictures, charts, films, filmstrips, dioramas, exhibits, models, and transcriptions to television broadcasts must be used.

Audio-Visual Equipment Is Science in Action

Science has brought many new things into our lives, not the least of which is equipment for audio-visual communication. In an English class audio-visual equipment is merely the means by which the material of the film or transcription is presented to the pupils. However, in science classes the film itself, the projector, the transcription, the radio, and television are all examples of information being studied in the science classroom. Lenses, light, color, gears, sound, and many other examples are there for use.

Audio-visual equipment serves a dual purpose in the

science class, not only as a means to present information, but to serve as examples of the applications of many scientific principles.

Experiences that give opportunity for seeing and feeling the real thing are the experiences that help motivate the learning process. The story of living things comes alive to pupils in a class where real living things are studied, such as plants growing under various conditions, or cages where insects are going through their life cycles. A demonstration beehive or ant nest in the classroom helps pupils to understand the social behavior of insects far better than reading about them or having the teacher tell about them.

Films and Filmstrips Have Many Facets

Use of full color makes a film seem even more real for the pupil. What could do more for a learning experience than a color film showing examples of protective coloration in animals?

Films bring variety to the study of science. Through their use a pupil can take a trip through some industrial plant, or can observe plants and animals of other continents. Lapse-time photography can show the changes that take place during the growth of plants. In a motion picture, animation and photography can demonstrate a scientific principle with its applications, as a film on Newton's laws of motion. The functioning of an organ of the body can be shown by animated cartoons, as can also the workings of a jet engine.

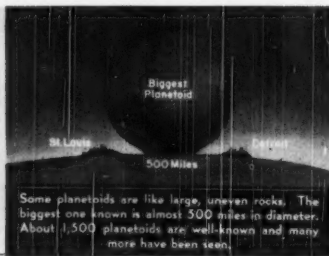
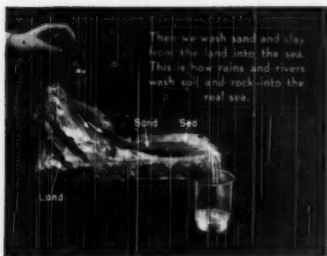
The filmstrip, in addition to the motion picture, is frequently used by many teachers. The filmstrip is especially valuable when used with a class discussion. The study of detailed parts of an object is possible because one frame may be left on for some time. The low cost of filmstrips makes possible a large collection of various topics available for use when they are needed, which is not always possible with motion pictures.

The diorama as a visual aid offers an excellent op-

"Our Earth Series" of slidefilms offers basic science background. (JHO)

In the "Sky Series" lessons like these serve general science pupils.

"Matter & Molecules" is an example of these Jam Handy slidefilm series.



portunity for student group activity. Each student can assume responsibility for various parts of the diorama. It is also an activity in which all ability levels can participate. Information gathering, construction, modeling, lighting: all offer problems that students can work out. A diorama can illustrate many learning situations, such as geologic periods, plant and animal habitat groups, good health practices, and others.

Working models are a valuable addition to instruction. They help illustrate and make clear the principles or applications being studied. To feel and see in the third dimension gives pupils added help in understanding and seeing how things work.

In science classes not only experiments and demonstrations, but also the actual room environment, is of value in motivating instruction. Here again visual material is the keynote for developing good room environment. Pictures, or displays of material, can be used to arouse pupil interest and tell what is coming next. Exhibits attractively arranged with suitable and colorful background, displays of material pertaining to

topics being studied, and experiments being carried on will all help to make the science room a place where pupils like to work. Of course, this material should be changed often for it is essential to keep it up-to-date.

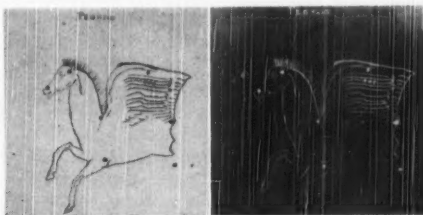
One of the most important problems in visualizing science instruction is in the selection and use of the material. In selecting materials, several things should be considered: accuracy, adaptability to grade level, and suitability to the purpose of the lesson. Audio-visual materials, particularly films, have sometimes been misused. Teachers need to develop skill in using audio-visual materials, as they develop skill in the use of any other teaching technique. The use of these materials should be planned as an integral part of the lesson, not as something added or as entertainment.

Audio-visual materials have many uses. They can be used as a means of arousing interest, introducing a topic, giving accurate information, reviewing material, or even as an evaluation of a lesson. Fortunate is the pupil whose teacher knows and uses audio-visual materials to make science instruction a vital, up-to-date, meaningful part of his education. ●

SEEING STARS on 2"x2" Slides

by Harold Hainfeld

Roosevelt School, Union City, New Jersey



PRESENTING A UNIT IN ASTRONOMY is often difficult on the upper elementary or junior high school level, for evening field trips are usually impractical, and viewing the stars is often difficult in large cities because of natural haze or smoke from factories and railroads. However, one solution of the problem is for the teacher and his pupils to prepare a classroom series of 2" x 2" slides of various constellations. All the equipment needed is a 35 mm camera, a tripod, one or two floodlights and a piece of etched glass.

Drawings of the various star formations are made with black India ink on white oak tag or drawing paper. Generally the camera can be focused from 2½ or 3 feet to infinity. Drawings can be made on 8½" x 11" paper if the camera can be focused at 2½ feet, or 11" x 14" paper at 3 feet. No special lens or close-up attachment is necessary.

The procedure for taking pictures of the star constellation drawings is as follows:

1. The camera is mounted on the tripod and placed at the shortest distance where it will be in focus.
2. Fix the camera for time exposure and press the shutter button. This will open the lens. Then turn on the floodlights.
3. Open the rear of the camera and hold a piece of

etched glass there. This will enable you to see the area to be photographed.

4. Place a drawing in this area on the wall or box. It will appear upside down when viewed through the etched glass, but don't worry about this.

5. Lock the tripod in place. Make sure it does not move.

6. Trip the shutter to close the lens. Load the film into the camera.

All that is then necessary is to photograph your series of constellation drawings. It may be advisable to take a series of shots at different exposures and at different shutter speeds. Our experience has been that using Super XX film with an exposure of f.8 at 1/100 second or f.11 at 1/50 second gives the best results.

When the film is developed, the white area on the drawing will be black, like the night sky. The black India Ink drawings of the constellations will be white, similar to the star formations that are being studied. When these are bound into slide form and projected, a most realistic impression is gained.

Pupils will enjoy making drawings of the constellations and mounting and binding them as 2" x 2" slides. They will take added interest in seeing stars as their drawings appear on the screen as an interesting addition to the visual education program. ●

Science Materials in Action

Through the Cooperation of Clyde K. Miller, Audio-Visual Supervisor,
Five Gary, Indiana, Science Teachers Describe Their Use of Materials

Materials Plentiful for BIOLOGY

by Lola Lemon, Lew Wallace School

★ *Biology, or any of the natural sciences*, is one of the richest fields in audio-visual materials. Films, filmstrips, slides, and charts are almost unlimited in number. The use of sound films and charts is of great importance.

In choosing a sound film try to select one which may be called a good teaching film; that is, it should have "meat" enough to provoke thought, be interesting enough to hold attention (but not merely entertaining) and scientifically correct, using and explaining scientific terms. Some good ones to use each year are: *The Grasshopper*, *The Honey Bee*, *The Frog*, *Circulation of the Blood*, *The Nervous System*, and *Trees*.

Probably it is more effective to use a film near the close of the unit of work. Some, however, prefer to introduce the unit by means of the film. It seems to me that after the students have studied the grasshopper, for instance, they are much more familiar with the terminology of the film and are interested in watching for certain things.

Just before the film is shown, we talk over several points which we hope the film will show and in some cases clear up for us. It is important that the teacher preview the film in order to supplement this part of the discussion.

After the film has been shown once and is being rewound for a second showing, students will have many

comments. These comments should be directed along the following lines:

1. Interesting points in the film.
2. New things learned.
3. Points which the student did not get clearly and which he must watch for in the second showing.
4. Errors in the film. Sometimes there are errors in pronunciation or indefinite points in the picture. The discussion between the first and second showing of the film is, perhaps, of most value.

After the second showing the film should be discussed again. Sometimes points have to be carried over until the next day because of lack of time in one period.

Charts, Filmstrips, Records Prove Value

We are fortunate at the Lew Wallace School in having a case of Schmeil Botanical Charts, Pfurtscheller Zoology Charts, and Amer-Trohse Anatomical Charts. Many slow-learning students get much more from the use of this material than they do from the printed page. Along with the Anatomical Charts it is good to use the human torso which helps to clear up size and location of organs.

The filmstrip is a good teaching device in that the teacher may run the film as fast or as slowly as he wishes.

A set of bird records is very good in studying the unit on birds. These records make it easier for students to recognize and learn bird songs and calls.

All of these aids and many others help to make biology a real, live science if the materials are used with a unit of work into which they fit and are not used just any time they happen to come along. This, of course, calls for careful planning.

Audio-Visual Progress in BIOLOGY

by Esther Tinsman, Emerson School

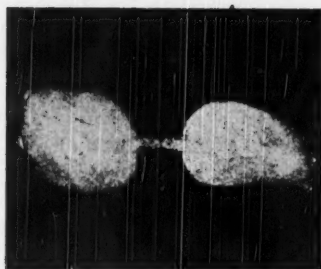
★ *In a world where the student* has his environment communicated to him largely by pictures, audio-visual aids must be used for successful learning.

The use of visual aids in science work have always interested me. When I found an unused projector in the school storeroom in 1928, I determined to experiment. The screen was small, but the interest aroused in the general science and nature classes was intense.

In 1929 I was transferred to the Emerson School in Gary and assigned classes in biology. Immediately I asked for a projector, but was refused. However, the next year my supervisor loaned her own lantern and



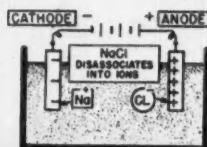
Students learn natural history from accurate classroom films such as *Five Colorful Birds* (Coronet).



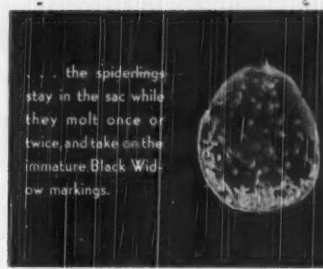
Above: A scene from the United World science film on "The Amoeba".

USEFUL SCIENCE MATERIALS

Below: A typical scene from "Foundations of Chemistry" SVE filmstrips.



In electrolysis of brine (NaCl), the molecule of salt dissociates into sodium (Na) ions and chlorine (Cl) ions.



Above: A close-up from "Nature's Enchanted Weedlands" filmstrip series.

some of her personal slides. Other slides were made from textbook charts and diagrams showing structure. There was no way to darken the room which was very bright with a south and west exposure. We had no screen; so a blank expanse of wall was used. On dark days any showing was about eighty percent successful; so we prayed for bad weather.

In 1935 the biology department was given a Delineascope equipped for both slide and opaque projection, a large wall screen, and black duck curtains. A dream had come true, and all visual material collected in the past five years could be put to use. Funds were limited and only a few slides could be purchased, but there was no limit to opaque material, only a discriminating choice of the most valuable.

You Need a Discerning Eye and Ready Scissors

Only a discerning eye and ready scissors are needed to secure an over-abundance of visual aids. All materials are classified according to animal and plant phyla and filed in heavy open top folders. At first a box was used for storage, now we have a steel file case.

Visual aids are used as an enrichment feature of the biology course, and the students are very enthusiastic. Queries of "when will we use the lantern"? or "this would be a good time for pictures" are daily occurrences. Sometimes visual aids are used as a motivating feature before a new unit is started; again they supplement the classwork, or are used as a round-up for review and written work.

The Opaque Projector Has Proven Invaluable

A filmstrip projector is now available with a few purchased films, but the strips offered free by the Metropolitan Insurance Company *Health Hero Series* are excellent as are those of the Sugar Research Foundation and the West Coast Lumbermen's Association. Even microscopic slides can be projected, the permanent ones being used over and over. This is a distinct advantage over those with living protozoa which remain alive for a short time only, due to the heat of the lamp.

To me the use of the opaque projector is invaluable. If I were denied all preserved and mounted materials, wall charts, and models, I would not complain if I still had a projector. It has made biology a vital subject to the hundreds of students as well as the teacher, even though she has to be the sound track.

The Range of Materials for CHEMISTRY

by Alfred L. Beckman, Roosevelt School

★ In the teaching of chemistry the following audio-visual instructional materials have been used: direct experience, field trips, models, demonstrations, sound films, filmstrips, slides, charts, graphs, still pictures, blackboard, and posters. All of the aids mentioned have been found adaptable to the teaching of chemistry.

When and how the above materials are used depend wholly upon what concept one is trying to impart to his pupils. In teaching the composition and properties of a compound such as sulfur dioxide, direct experience is used. The pupil is guided in setting up suitable experiments that will answer the questions that he has been led to want to know about the composition and properties of sulfur dioxide. The important uses of sulfur dioxide can best be shown by taking excursions to industries using the compound. Living in a highly industrialized area such as the Calumet Area makes this aid most available. To show how sulfur and oxygen combine to form sulfur dioxide (introduction to valence) models are used. Different colored wooden balls the size of billiard balls with detachable hooks are very useful to construct models of compounds and to show the combining power of the atoms composing them.

The Whole Class Participates Via Pictures

Teacher pupil demonstrations are employed to present the more difficult experiments and those experiments involving expensive apparatus. An example of these is the use of the analytical balance. Things too small to be seen by the whole class during such demonstrations can be pointed out by means of filmstrips, slides, diagrams, and the opaque projector. Sound films are used to introduce new units, to summarize units, to point out historical events in chemistry, to show experiments such as those that could not possibly be duplicated in the high school laboratory, and to point out what is theoretically happening during a chemical change. This is found to be the most versatile of all teaching aids with perhaps the possible exception of the blackboard. The filmstrips, slides, and still pictures are used in solving problems in chemistry; to translate word pictures into visual pictures; to cause a pupil to visualize the structure

(CONTINUED ON THE FOLLOWING PAGE)

Science Teacher Experiences:

(CONTINUED FROM THE PRECEDING PAGES)

of an atom, an ion, or a molecule in such a way as to be in accord with the present day theories; to create interest; and to correct mistaken impressions. Charts and graphs help pupils to see the relationships of the facts learned in chemistry. The blackboard is used by the teacher and pupil for simple diagrams, drawings, sketches, and solving of problems.

The use of audio-visual instructional materials by the chemistry teacher may be compared to the use of tools by an automobile mechanic. A good mechanic is constantly on the lookout for new tools. He learns how to use all available tools. He discards tools that become obsolete. He retains those that are needed. In short a good mechanic has all the available useful tools and he has learned what tools to use to do the job in its easiest and most efficient manner.

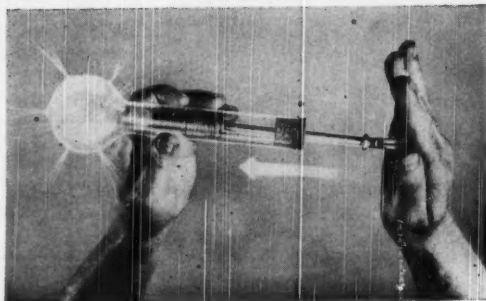
New Demonstration Methods in PHYSICS

by Floyd Flinn, Emerson School

★ In recent years the term "audio-visual" has become a very popular instructional term synonymous to many teachers with the phrase "classroom movies." In the physics class we find the use of "audio-visual" materials an old friend dressed up with a new name, since for many years we have found the demonstration method ("audio-visual" in reality) to be one of our most effective classroom procedures. The physics instructor has always advocated trips to the local industrial plant so that the student may see actual production processes. These trips have gradually been supplemented by many excellent sound motion pictures.

In Gary we use the United States Steel Corporation's technicolor film *Steel—Man's Servant*, extensively. This factory visitation type of film may serve as an excellent introduction to a unit of work. For example *Steel—Man's Servant* shows many applications of machines. Another useful film of this type is General Electric's *When You*

The Bray Films on "Aerodynamics" were among the first authoritative subjects in this science field.



A scene from one of the Jam Handy "High School Physics" slidefilms showing "transmitting pressure through fluids".

Can Measure which arouses interest in electrical measurements. These films, like most industrial films, are free except for transportation charges.

For a more technical presentation of the subject matter of physics the film library of the Civil Aeronautics Administration is an excellent source of audio-visual materials. Among the offerings there, the film *Application of Pascal's Law* is especially useful in connection with a study of Pascal's Law. A highly technical film is especially useful and meaningful near the end of a unit to supplement class demonstrations and experiments.

In addition to films the classroom model helps the student to visualize the topic under consideration. For example in my classes the unit "Defects of the Eye" has been easier for the students to understand since we have used various lens combinations in simple jigsaw cutouts of eye cross-sections. To illustrate nearsightedness we use an elongated cross-section with a concave "eye-glass" which brings the image into focus on the retina; to illustrate farsightedness we use a shortened cross-section with a convex "eye-glass" which brings the image into focus on the retina.

All of these audio or visual devices have proved very useful in helping the student to form audio or visual images and therefore to understand many aspects of learning which otherwise would be difficult to comprehend.

Audio-Visual Techniques for PHYSICS

by John Hayes, Lew Wallace School

★ The subject of physics makes a definite contribution to the culture of all students taking the course. A vocational value is gained by those working with machinery, in industry or entering apprentice training. The course prepares students for engineering courses and it increases the understanding and intelligent use of physics principles found in domestic equipment. Such objectives, if realized, call for considerable planning and a variety of equipment and methods of presentation. To accomplish these objectives a rather elaborate comprehensive, long range program is essential. Basic considerations involve the text book to be used, the laboratory experiments to be done and consequently,

what equipment to purchase and how much, and a philosophy that financially, "where there is a will there is a way".

Relative values of the units and the difficulty of learning of various principles must be weighed in planning. This plan included the purchase of a Bell & Howell sound machine, strip film projector, and a physics sound film library as a part of my equipment. All of the sound films of the various producers were viewed through a rental system and on a preview purchase basis. From these films a list of the most suitable was made.

Such criteria as black and white versus color, "up to dateness", relative value between various films made for the same purpose, expected value of films not yet produced, technical value, cultural value, student opinion, and whether the film was needed to enhance the specific learning situation are considered.

A color film, Coronet, *Matter and Energy* was purchased. The showing of this film is especially valuable when used with the first unit in Dull's "Modern Physics". This film has orientation value when used the second or third day with a beginning class. Students are impressed with the "up to dateness" of the equipment and methods used. The student acquires an overview of the unit in a few minutes. He is pleased with his electing physics. The picture adds to his confidence of feeling that he is able to master the unit. He saw some of his observations in life verified and after comparing these observations with his readings he is ready to converse and contribute to class discussion. Showing the picture without preparation added to the feeling of discovery. The unit was studied and the picture shown again. The satisfaction of comprehensive mastery was evident and retention of learning increased.

In another class, the unit was first studied, then the film shown. The learnings were increased but the feeling of discovery was not as rich.

A Castle film in black and white on *Pascal's Law* was purchased. Color was not considered of value here. This film is being used because of the difficulty of mastery of Pascal's law and its applications.

A Coronet color film on *Nature of Sound*, is on our list. The first scene is out of doors. It is a natural situation in which to become curious about the velocity of sound. This film broadens the awareness of the relationship between sound and our physical environment. It increases our appreciation of the mechanics of sound. The student realizes that the use of the mechanics of sound has increased the happiness and welfare of people. A scene takes place in a radio club room which is quite vivid and meaningful to the technical minded student. The use of color adds considerable to the observers' learnings. The oscilloscope is used to picture vibrations and the effect of pitch and intensity on them.

The use of films adds variety to learning experiences for the student and many students are reached with films who otherwise are not reached. Films make much of the material more meaningful. The motion, the sound, the picture and the short time used produces more learning and often furnishes a unity or comprehensiveness not acquired by other methods in the same degree or in the same time. Students actually see more.

A REPORT ON SCIENCE FILM USAGE IN COLLEGE BIOLOGY

What Students Think

by Robert A. Bullington

MacMurray College, Jacksonville, Illinois

I TEACH THE COURSE "Foundations of Science," which is designed for non-science majors. The first semester stresses the physical sciences, and human biology is studied in the second.

The particular class I describe here includes 55 students, mostly freshmen, and instruction is principally by lecture and discussion. Demonstrations are frequently presented with the lectures in place of lab work, and various types of audio-visual aids are used extensively. These aids include maps, charts, models, demonstration apparatus, specimens, and projected aids such as slides, filmstrips, opaque projection, and motion pictures.

The motion picture program is carefully planned in advance, and carefully selected films are used which correlate effectively with the classwork. An average of one film a week, or 15 per semester, is used. It is very seldom that more than one film is selected for any single class period.

Careful Selection of Materials Essential

There are innumerable films in the sciences that might be used in a general course. Only those are chosen which can contribute to an achievement of the objectives of the course. Some films are used to introduce a subject. Others are used as a summary. Still others supply the basic information that is presented in certain topics. An occasional picture is shown for its inspirational value.

The study I now describe was conducted during the first month of the second semester. The subject matter was a unit on human physiology and anatomy. Although other films were shown in the unit, the two considered here are *Heart and Circulation* and *Endocrine Glands*.^{*} They are films that have been in use for many years, which indicates their continuing worth.

Study is Based on Reactions to Two Films

The uses of the two films will be considered separately.

Heart and Circulation. This motion picture was used as the conclusion of a one-hour lesson on the circulatory system. The lesson was preceded by the reading of a textbook assignment. The first 30 minutes of the period were devoted to a discussion of heart structure, the blood vessels, and the path of the blood. A three dimensional model of the heart, a chart of the heart and one of the circulatory system were used. The film was intentionally used as a summary.

A poll of the students the next day indicated that 42

(CONTINUED ON THE FOLLOWING PAGE)

^{*} *Heart and Circulation* (10 min.) B&W, EBFilms; *Endocrine Glands* (10 min.) B&W, EBFilms.

Students Report on Science Films:

(CONTINUED FROM THE PRECEDING PAGE)

of them agreed that the movie should be shown at the end of the period. Only three said it should come at the beginning. Nine thought it should be used both at the beginning and at the end of the lesson.

The students were asked to write down their reactions to the film and especially to indicate any new concepts they had gained, even after the intensive preliminary study. The following statements indicate the opinions of various students. *There was general agreement concerning the first four items.*

Students Agree on These Main Points

1. The film served as an excellent review. It clarified various concepts and gave a more complete understanding of the circulatory system.

2. If the film had been used alone, without the preliminary discussion, much of it would have had little meaning.

3. A number of the students learned new facts or understood certain things for the first time.

- a. The film made the subject more interesting.
- b. It made the textbook more understandable.
- c. It gave a composite picture of the subject.

One student reported that she remembered best the parts of the film that were the most "dramatic"—the "gory" parts, as she said. Another reported that she was so nauseated by the views of internal structure of animals that she could not view the film.

One student was confused because she could not identify many anatomical parts that were shown in the rapidly moving sequences.

Follow-Up Discussion Is Clearly Needed

The instructor noted that facial expressions of characters in some of the early scenes of the film caused laughter in the class. Thus the opening lines of the narration were heard by very few of the students.

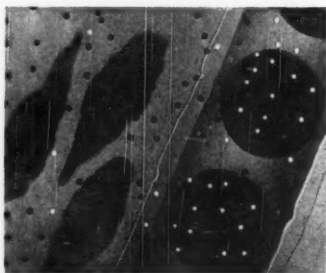
The student comments indicated that a follow-up discussion of this film is necessary in order to answer questions and to clear up dubious points.

It must be concluded that the total result was one of considerable value to the class, even though various students gained different values from the use of the film, Heart and Circulation.

The film *Endocrine Glands* was used as the concluding phase of a two-day lesson on the endocrine system.

"HEART and CIRCULATION"

A scene from the classic Encyclopaedia Britannica film discussed in these pages.



The students were assigned readings in the textbook for each day. The various glands were discussed in turn. A large colored chart was used. Also each student was presented with a diagram of the human body and all the endocrine glands. This diagram carried information concerning hormone-deficiency symptoms and other aspects of the subject.

Majority Prefer Film at End of Unit

The students were told that they would be asked to answer certain questions following the viewing of the picture, *Endocrine Glands*. The tabulated results from these answers follow.

Forty-three students said the film should be shown at the end of the unit. Five indicated that it should come at the middle and two at the beginning. Five said it should be shown both at the beginning and at the end.

Nine students recommended two showings; the remaining 46 believed one showing to be sufficient.

The students were quite evenly divided on the question of having an outline of the film provided for them by the teacher. Twenty-five said yes; 29 said no.

Thirty-five students reported that they did not learn anything new from the picture. However, all but three of the class recommended the continued use of the film in the unit on the endocrine system. Most were of the opinion that it served as a good review.

There were many favorable comments:

(1) *The movie provided a better understanding of the subject.*

(2) *The experiments upon animals made a vivid impression.*

(3) *One remembers material learned from pictures better than that on the printed page.*

One student said that the film was unnecessary, for the text and lectures were sufficient. Another objected to it because she had seen it in high school.

There were a few criticisms of the picture. It was incomplete; i.e., it did not cover all of the endocrine glands. In parts it was not clear, for it did not make a careful distinction between glands.

Film Material Is Vivid and Memorable

There are other films used in the course that have much greater informational value than the two discussed here. Some present material that can be brought to the student in no other way. The techniques of time-lapse photography and animation make important contributions to the understanding of various concepts by the students. *Furthermore, films can bring material to the student that can be seen in no other way.*

For example, one of the films discussed here showed the beating of an animal heart with its rhythmic and synchronized contractions. The other film contained scenes of an experiment upon a goat. The parathyroid glands were removed and the results were noted. Such scenes make a vivid and lasting impression upon the student.

A careful selection and intelligent use of motion pictures will improve the understanding and increase the knowledge of the students. Their interest in the course in general and many aspects of it in particular will be aroused. It is possible for any teacher to improve the quality of his teaching through the use of films. ●

ASTRONOMY

ASTRONOMY SERIES (2 filmstrips) —SVE
1. Buildings, Instruments, and Solar Phenomena 2. Moon, Planets, Comets, Star Clusters, Nebulae

ATOMIC SCIENCE

The Atom (55 frames) Part Color Reading Text —Life
The Atomic Bomb (20 frames) Sound (20 min, 78 rpm) Guide —Lewellen
Atomic Energy (55 frames) Guide —NY Times
Atomic Energy (75 frames) Guide —Vis Sci
Atomic Energy: Problems of International Control (88 frames) Guide Loan —UN Film Div
The Atomic Theory (45 frames) Guide —McGraw-Hill
Our Atomic World Series (2 filmstrips) Color —SVE/Council On Atomic Implications, Inc.
1. Let's Look At the Atom 2. The Atom At Work
Peace-time Uses of Atomic Energy (20 frames) Sound (20 min, 78 rpm) Guide —Lewellen
Story of Atomic Energy (75 frames) Guide —SVE
Structure of the Atom (49 frames) Guide —McGraw-Hill
Up and Atom (70 frames) Reading Text —Film Pub

BIOLOGY

NATURE STUDY ILLUSTRATED (30 filmstrips) Guide —SVE-Long
1. Bird Studies From Coast To Coast 2. Birds and Their Nests 3. Bills and Feet Of Birds 4. Bug-eating and Blossom-eating Lizards 5. Slithering Snakes and Hard-shelled Turtles 6. Opossums, Toads, and Salamanders 9. Silverfish To Stinging Bees 10. Butterflies and Moths 11. Yellow-jackets 12 Insect Life Histories 13. Insect Dragons Of Air and Water 14. Spiders and Their Work 15. How Animals Get Food 16. How Animals Get Air 17. How Animals Protect Themselves 18. How Animals Grow Up 19. How Animals Reproduce Themselves 20. Famous Forest Trees 21. Western Wild Flowers 22. Trees Of Valley and Foothill 23. Ferns and Horsetails 24. Mushrooms and Puffballs 25. Climate and the Elfin Forest 26. Clouds and Weather 27. Life On the Desert 28. The Story Of Glaciers 29. Sea, Beach, and Tidepools 30. The Redwood Trail
NATURE'S ENCHANTED WEEDLAND SERIES (6 filmstrips) —SVE
1. Biology Of Spiders—The Black Widow 2. Biology Of Spiders—Reproduction, the Black Widow 3. Biology Of Spiders—Spider Houses 4. Biology Of Spiders—Biological Control 5. Biology Of Spiders—Protective Modeling and Color 6. Biology Of Spiders—Active Camouflage
PRINCIPLES OF BIOLOGY (9 filmstrips) —SVE-Visual Science
1. Animal Cell Structure, One-celled Animals, Sponges 2. Coelenterata, Platyhelminthes, Nemathelminthes, Annelida 3. Echinodermata, Mollusca 4. Arthropoda 5. Chordata 6. Man and Other Primates 7. Thallophyta, Small Bryophyta, and Pteridophyta 8. Spermatophyta and General Biology 9. Microbiology

BOTANY

Food From the Sun (50 frames) Color Guide —Sugar Res Foundation
Poison Ivy Color Sound (19 min) Loan —AT&T
Royal Horticultural Society (32 frames) —BIS
Trees (36 frames) Color Guide —Stillfilm
Western Wild Flowers Guide —SVE

A Checklist of Selected Filmstrips FOR SCIENCE INSTRUCTION

CHEMISTRY

Acid and Basic Solutions (43 frames) Guide —McGraw-Hill
The Chemical Formula (55 frames) Guide —McGraw-Hill
Electrolysis (42 frames) Guide —McGraw-Hill
Equations (35 frames) Guide —McGraw-Hill
FOUNDATIONS OF CHEMISTRY (10 filmstrips) —SVE
1. The Atmosphere 2. Carbon and Its Oxides 3. Chlorine and Its Compounds 4. Facts and Laws 5: Fire and Fuels 6. Laws and Theories 7. Nitrogen and Its Compounds 8. Oxygen and Hydrogen 9. Sulphur and Its Compounds 10. Water
Ionization (42 frames) Guide —McGraw-Hill
Kinetic Molecular Theory (59 frames) Guide —McGraw-Hill
Metals (63 frames) Guide —SVE
Nonmetals Guide —SVE
Periodic Table (50 frames) Guide —McGraw-Hill

GENERAL SCIENCE

ADVANCED NATURE STUDY SERIES (11 filmstrips) —SVE

1. Life Of the Swallowtail Butterfly 2. Some Frogs, Toads, and Salamanders, and How They Live 3. How Color Protects Animals 4. Some Lizards, Snakes, and Turtles 5. How Insects Get Food 6. How Insects Grow Up 7. Animal Parade: Sea Anemone To Man 8. The Life Of the Horned Lark 9. Hunting Waterfowl With a Camera 10. Life and Work Of the Beaver 11. Wild Animals, a Visit To the Zoo 12. Desert Animals and How They Live

ANIMAL FRIENDS (8 filmstrips) —EB-Films

1. The Horse 2. Gray Squirrel 3. Three Little Kittens 4. Shep the Farm Dog 5. Black Bear Twins 6. Elephants 7. Goats 8. Common Animals Of the Woods
Animal Habits (25 frames) Guide —Classroom Films

The Animal Kingdom Is Big (25 frames) Guide —Classroom Films

Animals Around the World (44 frames) Color Guide —Pop Sci

Animals Of the Pond (24 frames) Color Guide —Curriculum

Ann Visits the Zoo (26 frames) Color Guide —Curriculum

Arriving At the Zoo (25 frames) Guide —Classroom Films

Baby Farm Animals —Stillfilm, Inc

Balance Among Living Things —Pop Sci

BASIC BIRD STUDY (6 slidefilms totaling 429 pictures) Jam Handy

1. The Structure Of Birds (53) 2. Adaptations Of Birds (95) 3. Birds' Nests (52) 4. The Migrations Of Birds (67) 5. How Birds Serve Man (78) 6. Helping the Birds (84)

BASIC SCIENCE SERIES (6 filmstrips) Guide —SVE-Row, Peterson

1. Electric Magnets 2. Electricity 3. Our Ocean Of Air 4. Permanent Magnets 5. Simple Machines 6. The Air About Us 7. Living Things (Color) 8. Telling Trees Apart (Color)

Birds Color Guide —Eye Gate

Birds Of the Zoo (25 frames) Color Guide —Curriculum

Birds—Their Value To Agriculture (61 frames) Reading Text —USDA

The Brook (26 frames) Color Guide —Curriculum

Butterflies (36 frames) Color Guide —Stillfilm, Inc

Cats Color Guide —Eye Gate

Changes In Weather —Pop Sci

The Children's Zoo Guide —Eye Gate

Chucky Lou, Woodchuck —Indiana U

Communities Of Living Things —Pop Sci

Cows Color Guide —Eye Gate

Day and Night (34 frames) Guide —Yng Amer

Electricity (41 frames) Guide —Yng Amer

ELEMENTARY NATURE STUDY SERIES (9 filmstrips) —SVE

1. How Young Birds Get Food 2. How Animals Are Protected From Their Enemies 3. The Growing Of the Toad and Tree Toad 4. The Growing Up Of the Monarch Butterfly 5. The Growing Up Of the Buck Moth 6. The Growing Up Of the Texas Night Hawk 7. The Growing Up Of the Barn Owl 8. Some Squirrels and Other Gnawing Animals 9. Some Spiders and How They Live

ELEMENTARY SCIENCE SERIES (11 filmstrips) —SVE-Visual Science

1. Water 2. Air 3. Mechanics I (Levers) 4. Mechanics II (Inclined Plane) 5. Mechanics III (Pulleys—wheel and axle) 6. Energy 7. Fire and Heat 8. Sound 9. Light 10. Magnetism 11. Electricity

Fish Color Guide —Eye Gate

Fish of the North Pacific (36 frames) Color Guide —Stillfilm, Inc

Flow Of Electricity —Yng Amer

Forest Resources Guide —Eye Gate

From Egg to Chick —Trindle King

Fun For Everybody (25 frames) Guide —Classroom Films

GENERAL SCIENCE (8 filmstrips) —EB-Films

1. Simple Machines 2. Elements Of Electrical Circuits 3. Series and Parallel Circuits 4. Home Electrical Appliances 5. Fuels and Heat 6. Distributing Heat Energy 7. Atmosphere and Its Circulation 8. Weather

GENERAL SCIENCE WHY SERIES (4 filmstrips) —SVE

1. Why Does the Wind Blow? 2. Why Does the Weather Change? 3. Why the Seasons? 4. Why Does It Rain, Snow, Hail and Sleet?

Glaciers and Their Work Guide —Eye Gate

HISTORY OF MEASURES SERIES (6 filmstrips) —Yng Amer

1. History Of Area Measures (31 frames) 2. History Of Linear Measures (36 frames) 3. History Of Our Calendar (35 frames) 4. History Of Our Number System (35 frames) 5. History Of Telling Time (38 frames) 6. (CONTINUED ON THE NEXT PAGE)

Key to Filmstrip Listings

● Unless otherwise noted, all filmstrip listings refer to **black and white, silent 35mm strips**. "Color" is directly indicated; "sound" refers to sound slidefilms with recorded sound on either 78 rpm or 33 $\frac{1}{3}$ rpm discs. Where the number of frames or scenes is available this fact is indicated thus: (53) after titles. Guide refers to an accompanying teacher's guide; reading text to a complete script of the filmstrip for class reading. Very few of these subjects are of the "sponsored" or "free loan" type; most can be purchased from audiovisual dealers at low-cost for regular classroom use.

Science Filmstrips:

(CONTINUED FROM PRECEDING PAGE)

History Of Weight and Volume Measure (36 frames)

Home For Water Plants and Animals -Pop Sci

Honeybees (36 frames) Color Guide -Still-film, Inc

Horses On the Farm -Trindle-King

Hot Springs and Geysers Guide -Eye Gate

How Birds Are Protected -SVE

How Man Mastered Fire (40 frames) Guide -Pop Sci

How We Get Our Gas (43 frames) Guide -Am Gas

How We Get Our Oil (42 frames) -Yng Amer

INTERMEDIATE SCIENCE (9 filmstrips) Color Guide -Eye Gate

1. What Is In the Sky 2. How Our Earth Began 3. About Our Earth 4. Our Earth Is Moving 5. Our Changing Earth 6. The Beginnings Of Life 7. Animals Of Long Ago 8. Man Of Long Ago 9. Parts Of A Flowering Plant

Jerry Giraffe and the Zoo Guide -Eye Gate

Life at the Timberline Guide -Eye Gate

Looking for Animals Color Guide -Eye Gate

Low Tide at the Beach (27 frames) Color Guide -Curriculum

Magnets (46 frames) Guide -Yng Amer

Making Bricks for Houses (78 frames) Guide -EB Films

Making Glass for Houses (81 frames) Guide -EB Films

Mammals of North America Color Guide -Eye Gate

Man's Use of Fire (40 frames) Guide -Pop Sci

Mealtime at the Zoo (25 frames) Guide -Classroom Films

Mother Hen -Trindle-King

ON THE FARM WITH TOM AND SUSAN (6 filmstrips totaling 223 frames) Guide -Pop Sci

1. Visiting the Farm 2. Animals and Their Young 3. How Plants Live and Grow 4. Animal Homes 5. Tools and Simple Machines 6. Science Review

OUR EARTH SERIES (5 slidefilms totaling 318 pictures) -Jam Handy

1. How We Think Our Earth Came To Be (53) 2. Our Earth Is Changing (53) 3. How Rocks Are Formed (62) 4. The Story Of the Earth We Find in the Rocks (85) 5. The Soil (65)

Plants and Animals Of the Desert Guide -Eye Gate

Rabbits Color Guide -Eye Gate

Raindrops and Erosion (50 frames) Reading Text -USDA

Reptiles Color Guide -Eye Gate

Sandy Is a Ground Squirrel -Aud-Vis Ent

THE SKY SERIES (7 slidefilms totaling 367 pictures) -Jam Handy

1. A Multitude Of Suns (56) 2. Stories Of the Constellations (53) 3. The Sun's Family (35) 4. Interesting Things About the Planets (63) 5. Our Neighbor, the Moon (46) 6. The Changing Moon (69) 7. How We Learn About the Sky (45)

Snakes Color Guide -Eye Gate

Soil Resources Guide -Eye Gate

Sonny and His Barnyard Friends (86 frames) Color Sound -Depicto

Story Of Cacti Guide -Eye Gate

Texas Green Gold (58 frames) Guide Loan -Tex For Serv

The Turtles (29 frames) Color Guide -Curriculum

Understanding Weather Conditions -Pop Sci

Volcanoes In Action Guide -Eye Gate

WATER LIFE SERIES (7 slidefilms totaling 417 pictures) -Jam Handy

1. Life In Ponds, Lakes, and Streams (57) 2. Small Fresh-Water Animals and Insects (52) 3. Fresh-Water Shellfish and Amphibians (67) 4. Fresh-Water Turtles and Fish (68) 5. Keeping an Aquarium (55) 6. Plants and Strange Animals Of the Sea (59) 7. Shellfish Of the Seashore (59)

Water Supply (60 frames) Color -Academy

We Learn About Weather -Pop Sci

What Makes Rain (40 frames) Guide -Yng Amer

Wildlife and Soil Conservation (58 frames) Reading Text -USDA

GEOLOGY

Classification and Recognition Of Clouds, I: High Clouds (26 frames); II: Middle Clouds (26 frames); III: Low Clouds (26 frames); IV: Clouds Of Vertical Development (34 frames) Guide Loan -CAA

ELEMENTARY METEOROLOGY SERIES (5 filmstrips) Guide -SVE

1. Elements Of the Weather and Atmospheric Circulation 2. Cloud Formations and Air Masses 3. Cloud Types and Portents 4. Cold Front 5. Meteorological Instruments and Fronts and Forecasts

Navy Quiz No. 2: Aerology (91 frames) Guide Loan -CAA

Navy Quiz No. 44: Weather Map Symbols (87 frames) Guide Loan -CAA

Oil Hunters (51 frames) Guide -St Oil NJ

Weather (72 frames) Guide Loan -CAA

Weather Control During Instrument Flight, I (78 frames) Sound (23½ min) -CAA

MATHEMATICS

ALGEBRA SERIES (7 filmstrips) -SVE

1. Introduction To Algebra 2. Graphs 3. Introduction To Signed Numbers 4. Formulas 5. Introduction To Equations 6. Addition and Subtraction Of Signed Numbers 7. Multiplication and Division Of Signed Numbers

FRACTIONS (9 filmstrips) Color Guide -Eye Gate

1. What Is a Fraction? 2. Writing Fractions 3. Fractions Of a Group 4. How Large Is a Fraction? 5. Adding Fractions 6. Common Denominators 7. Mixed Numbers 8. Using Mixed Numbers 9. Multiplying Fractions By Fractions

History Of Our Number System (35 frames) Guide -Yng Amer

INTEGRAL CALCULUS SERIES (4 filmstrips) -SVE

1. Areas By Integration 2. Double Integrals 3. A Triple Integral 4. Areas By Integration Using Polar Coordinates

LIGHT ON MATHEMATICS (25 slidefilms totaling 1,087 pictures) -Jam Handy

1. Five Keys To Math (46) 2. Mathematics and the Pilot (46) 3. Addition and Subtraction (16) 4. Multiplication and Division (27) 5. Fractions, Decimals, and Percentage (55) 6. Addition and Subtraction Of Fractions (13) 7. Multiplication and Division Of Fractions (21) 8. Square Root and Cube Root (46) 9. Order Of Operations (37) 10. Addition and Subtraction In Geometry (51) 11. Multiplication and Division In Geometry (48) 12. Angular Measurement (68) 13. Constructions (57) 14. Scales and Models (80) 15. Vectors (52) 16. Trigonometry (35) 17. Positive and Negative Numbers (48) 18. Ratio and Proportion (40) 19. Exponents and Logarithms (70) 20. The Arithmetic Of Algebra (40) 21. Equations and Formulas (53) 22. Problem Analysis (37) 23. Graph Uses (49) 24. Plotting Graphs (62) 25. Analytic Geometry (36)

PLANE GEOMETRY SERIES (12 filmstrips) -SVE

1. Introduction To Plane Geometry 2. Basic Angles and Experimental Geometry 3. Basic Triangles 4. Introduction To De-

monstrative Geometry 5. Quadrilaterals 6. Parallel Lines and Transversals 7. Loci 8. Areas 9. Similar Polygons 10. Introduction To Circles 11. Common Tangents and Tangent Circles 12. Congruent and Overlapping Triangles

PRIMARY ARITHMETIC (6 filmstrips totaling 260 frames) Color -Pop Sci

1. What Numbers Mean 2. Zero a Place Holder 3. A Number Family In Addition 4. Compound Subtraction 5. The Threes 6. The Twos In Division

USING NUMBERS (16 filmstrips) -EB Films

1. Counting To 5; 2. Counting To 10; 3. Reading Numbers To 10; 4. Writing Numbers To 10; 5. Counting By 10's To 30; 6. Counting By 10's To 50; 7. Counting By 10's To 80; 8. Counting By 10's To 100; 9. Counting From 10 to 15; 10. Counting From 15 to 20; 11. Counting From 20 to 40; 12. Counting From 40 to 100; 13. Reading Numbers To 50; 14. Reading Numbers To 100; 15. Working With Numbers To 100; 16. Writing Numbers To 100

PHYSICS

Adventure in Electronics (36 frames) Color -Reading Text Loan -GE

Audio Frequency Amplification -Castle-UN

BASIC ELECTRICITY (12 slidefilms totaling 888 pictures) -Jam Handy

1. Magnetism (56) 2. Static Electricity (91) 3. Current Electricity (73) 4. The Electric Cell (46) 5. The Storage Battery (101) 6. Electromagnetism (80) 7. The Generator (80) 8. Alternating Current (85) 9. Electric Motors (70) 10. Electric Meters (81) 11. Applications I (63) 12. Applications II (74)

Capacitance -Castle-UN

Capacitive Reactance -Castle-UN

Corrosion -Castle-UN

Detection (RM-BTRS) -Castle-UN

ELECTRICITY SERIES (8 filmstrips) -SVE-Long

1. AC and DC Generators 2. AC Voltmeters and Ammeters 3. Condensers and Choke Coils 4. DC Voltmeters and Ammeters 5. Electricity At Work 6. Motors 7. Resistance 8. Transformers

Elementary Electricity-Current and Electromotive Force -Castle-UN

Elementary Electricity-Ampères, Volts and Ohms -Castle-UN

Elementary Electricity-Series and Parallel Circuits -Castle-UN

FLUIDS-A Unit of Air Age Physics (13 slidefilms totaling 1042 pictures) -Jam Handy

1. Liquid Pressure (77) 2. Transmitting Pressure Through Liquids (52) 3. Buoyancy and Archimedes' Principle (57) 4. Density and Specific Gravity-Flotation (50) 5. Specific Gravity Of Solids and Liquids (105) 6. Atmospheric Pressure (67) 7. Exploring the Atmosphere-Streamline Flow (90) 8. Barometers and the Weather (88) 9. Gas Pressure (70) 10. Meas. Fluid Pressure (50) 11. Bernoulli's Principle (53) 12. Reciprocating Pumps (109) 13. Jet Pumps, Siphons, Rotating Pumps (103)

Forces In Flight (72 frames) Loan -CAA

HEAT-A Unit of Air Age Physics (11 slidefilms totaling 699 pictures) -Jam Handy

1. Temperature (71) 2. Heat Expansion (65) 3. Gas Expansion (52) 4. Measurement Of Heat (46) 5. Fusion (53) 6. Vaporization (71) 7. Refrigeration (69) 8. Humidity (70) 9. Heat Transfer (59) 10. Putting Heat To Work (69) 11. Internal Combustion Engines (72)

Inductance -Castle-UN

Inductive Reactance -Castle-UN

INDUSTRIAL ELECTRONICS COURSE

(12 filmstrips totaling 1306 frames) Sound (25 min ea) Guide -GE

1. Harnessing the Electron 2. Electronic Tubes As Rectifiers 3. Grid Control Of Electronic Tubes 4. Fundamentals Of Electricity, I 5. Fundamentals Of Electricity, II 6. Electronic Relay Systems 7. Electronic Rectifier Equipment 8. Thy-mo-trol (Thyatron Motor Control) 9. The Electronic Control Of AC Power 10. Electronic Frequency Changing 11. Photoelectric Relay Systems 12. Electronics—Today and Tomorrow

MATTER AND MOLECULES—A Unit Of Air Age Physics

(6 slidefilms totaling 405 pictures)—Jam Handy

1. Why Study Physics? (72) 2. Matter (77) 3. The Structure Of Matter 4. Effects Of Molecular Motion (55) 5. Molecular Forces In Matter (64) 6. Molecular Forces In Liquids (74)

Measuring Electrical Units: I —Castle-USN

MECHANICS — A Unit Of Air Age Physics

(14 slidefilms totaling 638 pictures)—Jam Handy

1. Units Of Measurements (36) 2. Force (52) 3. Force and Velocity As Vectors (42) 4. Uniform Motion (31) 5. Uniformly Accelerated Motion (28) 6. Newton's Laws Of Motion (38) 7. Gravitation (38) 8. Rotary Motion (45) 9. Centrifugal Force (43) 10. Work (30) 11. Energy (40) 12. Power (36) 13. Friction (56) 14. Simple Machines (91)

THE METALS SERIES

(6 filmstrips) Guide -SVE

1. Aluminum 2. Copper and Its Uses 3. Gold and Silver 4. Iron and Steel 5. Lead 6. Zinc

Radar — Parts I, II, III Sound Guide —Westing

Radio Frequency Amplification —Castle-USN

RCL Resistance, Capacitance, Inductance —Castle-USN

Regeneration

(23 frames) Loan -CAA

Reproducers —Castle-USN

Special Purpose Vacuum Tubes

(75 frames) Sound -Castle-USN

Synchro Systems — Parts I, II —Castle-USN

Tuning —Castle-USN

Vacuum Tubes —Castle-USN

We Look At Television

(50 frames) Color Sound (15 min, 33 $\frac{1}{3}$ or 78 rpm) Nestor Prod

ZOOLOGY

BIRD SERIES

(4 filmstrips totaling 299 frames) -SVE-Film Highlights

1. Birds -Perching Birds and Birds Of Prey (92) 2. Birds -Pelicans and Cormorants; the Ducks and Swans (65) 3. Birds -Varied Orders and Fowl-like Birds (71) 4. Birds -Varied Orders and Wingless Birds (71)

CARNIVORES, RODENTS AND CANINES SERIES

(7 filmstrips totaling more than 352 frames) -SVE-Film Highlights

1. Carnivores -The Cat Animals (52) 2. Carnivores -The Bears (57) 3. The Canines and Smaller Carnivores (69) 4. Carnivores -The Order Of Seals (66) 5. Rodents -The Smaller Species (48) 6. Rodents -The Larger Species (60) 7. Rodents -The Prairie Dog and the Beaver

Crustacea Of The Pacific Ocean

(85 frames) Guide -SVE

DEPTHS OF THE SEA SERIES

(4 filmstrips totaling 272 frames) -SVE-Film Highlights

1. Depths Of the Sea -Episode A (77) 2. Depths Of the Sea -Episode B (77) 3. Depths Of the Sea -Episode C (53) 4. Depths Of the Sea -Episode D (65)

HOOFED ANIMALS SERIES

(4 filmstrips totaling 500 frames) -SVE-Film Highlights

1. Hoofed Animals -The Deer (79) 2.

Hoofed Animals -Bovines, Sheep, Goats, and Antelopes (64) 3. Hoofed Animals -Giraffes, Camels, Wild Swine, and Hippopotami (76) 4. Hoofed Animals -The Odd Toed Ungulates and Elephants (81)

Housefly and Its Control

(34 frames) Reading Text -USDA

INSECTS, ARTHROPODS AND SPIDER SERIES

(8 filmstrips totaling 600 frames) Guide -SVE-Film Highlights

1. Insects -Life Histories of the Ant Lion, Dragon Fly and Cicada (62) 2. Insects -Aquatic Hemitera and the Crickets, Locust; Walking Leaf and Walking Stick (62) 3. Insects -The Beetles, Butterflies and Moths (92) 4. Insects -Transformations of Butterflies and Moths (103) 5. Insects -The Moths (77) 6. Insects -The Life of the Bee (79) 7. Arthropods -Millipedes, Centipedes, Scorpions, Spiders (57) 8. Life Histories of American Spiders (68)

Insects, Their Growth and Structure

(44 frames) Reading Text -USDA

ORNITHOLOGY SERIES

(8 filmstrips) Guide -SVE

1. Birds of the Orchard and Woodland 2. Coloration of Birds 3. How to Attract Birds 4. Land Birds of North America (no guide) 5. Migration of Birds 6. Structure

and Bill 7. Wings and Feet of Birds 8. Young of Birds

Pacific Salmon Run

(29 frames) Reading Text -SVE

PRIMATES, INSECTIVORA AND MARSUPIALS SERIES

(6 filmstrips totaling 380 frames) -SVE-Film Highlights

1. Primates -Anthropoid Apes (59) 2. Primates -New World Monkeys (59) 3. Primates -Old World Monkeys (59) 4. The Bats, Insectivora and the Flat-toothed Mammals; Edentates (70) 5. Marsupials -Kangaroos and Opossums (62) 6. Marsupials -The Egg-laying Mammals (67)

Quirks of Nature

(50 frames) Guide -Vis Sciences

REPTILES AND AMPHIBIAN SERIES

(9 filmstrips totaling 501 frames) -SVE-Film Highlights

1. Reptiles -The Viperine Serpents (62) 2. Reptiles -Boas and Pythons; Life Histories of Serpents (44) 3. Reptiles -The Harmless Colubrine Serpents (31) 4. Reptiles -The Poisonous Colubrine Serpents 5. Reptiles -New World Lizards (49) 6. Reptiles -Old World Lizards (45) 7. Reptiles -Turtles and Tortoises; The Crocodilians (75) 8. Amphibians -The Toads and Frogs (93) 9. Amphibians -The Salamanders, Newts and Allies (64)

A Checklist of Motion Pictures FOR SCIENCE INSTRUCTION

ASTRONOMY

Celestial Navigation: Bearings, Single Line of Position and Fixes.

(19 min) -Castle

Celestial Navigation: Charts.

(18 min) -Castle

Celestial Navigation: Introduction and Location of Celestial Points.

(18 min) -Castle

Celestial Navigation: Latitude by Polaris.

(10 min) -Castle

Celestial Navigation: Nautical Astronomy.

(24 min) -Castle

Celestial Navigation: Position Finding on the Earth.

(15 min) -Castle

Celestial Navigation: Solution of Illustrative Problems in Celestial Navigation.

(32 min) -Castle

Celestial Navigation: The Earth.

(16 min) -Castle

Celestial Navigation: Time.

(10 min) -Castle

Earth—Rotation and Revolution.

(9 min) -EPS

Exploring Space.

(9 min) -TFC

Exploring the Universe.

(11 min) -EB Films

Hermits of the Sky.

(10 min) -AF Films

Loran for Ocean Navigation.

(20 min) Loan -USCG

The Moon.

(11 min) -EB Films

Nautical Astronomy.

(23 min) -USOE

Navigation (Air)—Relative Movement: Part I: Relative Movement and Interception.

(14 min) -Castle

Navigation (Air)—Relative Movement: Part II: Out and In Search—Relative Wind.

(13 min) -Castle

Navigation (Air)—Relative Movement and Interception: Part III: Geographic Sector Search—Relative Sector.

(16 min) -Castle

Navigation (Air)—The Pioneer Bubble Sextant, Mark V—Part I

(15 min) -Castle

Navigation (Air)—The Pioneer Bubble Sextant, Mark V—Part II: Averaging Device, Adjustments, and Practical Use.

(15 min) -Castle

Navigation—Dead Reckoning (Air).

(34 min) -Castle

Navigation—Dead Reckoning, Plotting, and Celestial Lines of Position

(40 min) -Castle

Navigation—Night Piloting (Surface).

(17 min) -Castle

Navigation—Piloting (Surface).

(16 min) -Castle

Navigation—Star Identification.

(17 min) -Castle

Navigation—The Link Sextant (Air).

(15 min) -Castle

Navigation—The Sextant (Surface).

(32 min) -Castle

Navigation—Time.

(56 min) -Castle

Solar Family.

(11 min) -EB Films

Solar Prominences.

(11 min) -Mich U

Story of Palomar.

(40 min) Color -Calif Tech

Story of the Telescope.

(11 min) -Know Bldrs

Key to Film Listings

● All films listed on Pages 35-40 are 16mm sound motion pictures unless otherwise noted as "silent", etc.. All are black and white subjects unless designated by "color" or as available in both B&W and Color (as in Coronet listings). Running time is indicated in minutes as (20 min), following each title. The producer is indicated by abbreviation and keyed to an alphabetical source list on Page 40.

A great majority of these titles are also available in state, regional, county and commercial film libraries, where they may be obtained for preview at low-cost rentals.

Science Film Checklist:

(CONTINUED FROM PRECEDING PAGE)

ATOMIC SCIENCE

Atom Bomb—Bikini Experiment. (30 min) Color Sound —USN
The Atom Strikes. (31 min) Loan —US Army
Atomic Bomb Test—Bikini Island. (18 min) Loan —USN
Atomic Energy. (10 min) —EB Films
Atomic Physics. (100 min) —UWF
Atomic Power. (19 min) —MOT
Inside the Atom. (10 min) —Nat Film Bd
One World—Or None. (9 min) —Film Pub Report on the Atom. (20 min) —MOT
Tale of Two Cities (Atom Bomb) (12 min) —Castle

BIOLOGY

Alcohol and the Human Body. (14 min) —EB Films
Bacteria. (12 min) Silent —EB Films
Birth and the First Fifteen Minutes of Life. (10 min) Silent —New York U
Cell Division—The Basis of Growth in All Living Things. (11 min) —Phase Films
The Cell: Structural Unit of Life. (10 min) Color or B&W —Coronet
Circulatory Control. (15 min) Silent —EB Films
Control of Body Temperature. (11 min) —EB Films
Development of the Chick. (10 min) —UWF
Digestion of Foods. (11 min) —EB Films
The Ears and Hearing. (11 min) —EB Films
Earthworm. (9 min) Sound and Silent —EPS
Endocrine Glands. (11 min) —EB Films
Experimentally Produced Neurotic Behavior in the Rat. (25 min) Silent —Penn St Col
Fingers and Thumbs. (20 min) —Library Films
Fish Is Born. (10 min) —UWF
Foods and Nutrition. (11 min) —EB Films
The Green Plant. (15 min) Silent —Nat Audubon Soc
Growth of Mankind. (14 min) —Am Film Reg
Heart and Circulation. (11 min) —EB Films
Heredity. (11 min) —EB Films
How Animal Life Begins. (9 min) —Castle
Immunization. (11 min) —EB Films
In the Beginning. (17 min) —Castle
Leaves. (11 min) —EB Films
Living Cell. (15 min) Silent —EB Films
Matter and Energy. (10 min) B&W and Color Sound —Coronet
Mechanisms of Breathing. (11 min) —EB Films
The Microscope and Its Use. (10 min) —Yng Amer
Monkey Into Man. (20 min) —Library Films
Muscles. (15 min) B&W Silent —EB Films
Nervous System. (11 min) —EB Films
Nine Basic Functional Systems of the Human Body. (11 min) —Bray
Reproduction Among Mammals. (11 min) —EB Films
Subcutaneous Blood Flow in the Bat's Wing. (3 units, ca 10 min) B&W —Indiana U
Work of the Kidneys. (11 min) —EB Films

BOTANY

Blooming Desert. (11 min) Color —Simmel
Dispersal of Seeds. (12 min) Silent —EPS..
Flower Life in Yosemite National Park. (15 min) Silent —Kodascope
Fungus Plants. (11 min) —EB Films
Growth of Flowers. (10 min) Color —Coronet
How Seeds Germinate. (15 min) Silent —Castle
Hunger Signs. (15 min) Color Loan —Nat Fertilizer

Interdependence of Living Things. (15 min) Silent —Bray
*** Life of Plants**. (13 min) —Castle
Plant Oddities. (10 min) Color —Ott
Plant Speaks Through Deficiency Symptoms. (25 min) Color Loan —Am Potash
Plant Speaks Through Leaf Analysis. (18 min) Color. Loan —Am Potash
Plant Speaks Through Tissue Tests. (14 min) Color Loan —Am Potash
Science in Bloom. (10 min) B&W Sound —Nat Film Bd
Seasonal Changes in Trees. (10 min) B&W and Color —Coronet
Spring Blossoms. (22 min) Color —Ott
Study of Spring Wild Flowers. (15 min) Color Silent —Library Films
Time Lapse Photography. (10 min) Color —Ott
Wizards of Svalof. (14 min) —Castle

CHEMISTRY

Carbon and Its Compounds. (10 min) —Coronet
Catalysis. (11 min) —EB Films
Chemistry and a Changing World. (11 min) —EB Films
Chemistry of Combustion. (9 min) —EPS
The Chemistry of Fire. (46 min) —Castle
Colloids. (11 min) —EB Films
Colour. (15 min) Color —BIS
Crude Oil Distillation. (14 min) Loan —Shell
Crystal Clear. (10 min) Color Loan —AT&T
Crystal Gazers. (10 min) Loan —GE
Crystallization. (20 min) Silent —Bray
Dr. Langmuir—On Surface Chemistry. (30 min) —Brandon
Electrochemistry. (11 min) —EB Films
Flue Gas Analysis (Orsat Apparatus). (19 min) —Castle
Gas For Home and Industry. (20 min) —EB Films
Halogens. (10 min) B&W and Color —Coronet
Introduction to Chemistry. (10 min) B&W and Color —Coronet
Making Glass For Houses. (10 min) B&W —EB Films
Metal Crystals. (20 min) Silent Loan —Am Soc Metals
Molecular Theory of Matter. (11 min) —EB Films
Oxidation and Reduction. (11 min) —EB Films
Oxygen. (10 min) B&W and Color —Coronet
Report Of D.D.T. (20 min) Color —Du Pont
Romance of Radium. (10 min) —TFC
Safety in the Chemistry Laboratory. (15 min) —Indiana U
Solids, Liquids and Gases. (11 min) Yng Amer
The Story of D.D.T. (25 min) —BIS
Sulphur. (20 min) Color —USBM
Synthetic Fibers—Nylon and Rayon. (14 min) —EB Films
This Is Magnesium. (11 min) Loan —Princeton
Velocity of Chemical Reactions. (11 min) —EB Films
The Wonder of Chemistry. (10 min) —Yng Amer

GENERAL SCIENCE

Adventures of Junior Raindrop. (10 min) Color Loan —USFS
Air All Around Us. (10 min) —Yng Amer
All Flesh Is Grass. (30 min) Color Loan —Am Nat Livestock Assn
Animal Life. (11 min) —EB Films
Animals Growing Up. (10 min) EB Films
Ants. (10 min) —EB Films
Aphids. (11 min) —EB Films
Arctic Borderlands In Winter. (10 min) B&W and Color —Coronet
Arteries of Life. (10 min) Color —EB Films
Atmosphere and Its Circulation. (11 min) —EB Films
Autumn on the Farm (10 min) Color —EB Films
Baby Animals. (10 min) —Yng Amer
Baby Bear. (12 min) Silent —Bray
Beach and Sea Animals. (11 min) —EB Films
Beach Masters. (10 min) —Library Films
The Bear and Its Relatives. (15 min) —Coronet
Bears in Alaska. (10 min) Loan —USF&W
Beetles. (11 min) —EB Films
Biggest Bears. (10 min) Silent —Field & Stream
Bird Migration. (10 min) Color —Heidenkamp
Birds in Winter. (10 min) Color —Coronet
Birds of Inland Waterways. (10 min) Color —Coronet
Birds of Prey. (11 min) —EB Films
Birds of the Barrier. (10 min) —Post
Birds of the Countryside. (10 min) Color —Coronet
Birds of the Dooryard. (10 min) Color —Coronet
Birds of the Marshes. (10 min) Color —Coronet
Birds of the Sea. (10 min) —TFC
Birds of the Woodlands. (10 min) Color —Coronet
Birth of a Southern Pine. (15 min) Color —So Pulpwood
Birth of the Soil. (10 min) Color —EB Films
Black Bear Twins. (11 min) EB Films
Black-Necked Stilt. (6 min) Color Silent —EB Films
The Bluebird. (10 min) Color —Heidenkamp
The Bobolink and Bluejay. (10 min) Color —Coronet
Buffalo Lore. (9 min) B&W and Color —Hawley-Lord
Rushland Fantasy. (10 min) Color —Int FB
Butterflies. (11 min) —EB Films
Butterfly Botanists. (10 min) —Coronet
Camera Thrills in Wildest Africa. (10 min) —Castle
Camouflage in Nature Through Form and Color Matching. (10 min) Color —Coronet
Camouflage in Nature Through Pattern Matching. (7 min) B&W and Color —Coronet
Catching Crocodiles. (10 min) —Post
China Clay. (11 min) —BIS
Chuckey Lou. (10 min) Color —Indiana U
Chumming With Chipmunks. (14 min) Silent —Bray
City Water Supply. (11 min) —EB Films
Colour in Clay. (11 min) Color —BIS
Common Animals Of the Woods. (11 min) —EB Films
The Cow and Its Relatives. (10 min) Sound —Coronet
The Curious Coati. (8 min) —Yng Amer
Day At the Zoo. (9 min) —NY Zool
The Deer and Its Relatives. (10 min) —Coronet
The Desert. (10 min) B&W and Color —A Barr
Desert Demons. (9 min) —TFC
Desert Land. (10 min) —Library Films
Deserts. (10 min) B&W and Color —Coronet
Distributing Heat Energy. (11 min) —EB Films
Dodder. (11 min) —EB Films
Earth and Its Seasons. (10 min) —Know Bldrs
Earth in Motion. (11 min) —EB Films
Earth's Rocky Crust. (11 min) —EB Films
Electromagnets. (10 min) —Yng Amer
Excursions in Science—Nos. 1 to 6. (10 min ca) Loan —GE
Farm Animals. (11 min) —EB Films

SOURCES ARE LISTED ON PAGE 40

Fine Feathers. (10 min) Color —Austrl News & Inf
Fire. (10 min) B&W —EB Films
Five Colorful Birds. (10 min) Color —Coronet
Flow of Electricity. (10 min) —Yng Amer
Flowers At Work. (11 min) —EB Films
The Force of Gravity. (10 min) —Yng Amer
The Forest Grows. (11 min) Color —EB Films
The Forest Produces. (11 min) Color EB Films
Four Seasons. (32 min) Color —Nat Film Bd
Fuels and Heat. (11 min) —EB Films
Fungus Plants. (11 min) EB Films
Fur Seal. (10 min) —Yng Amer
Giants of the Jungle. (11 min) —TFC
Giants of the North. (15 min) —Bray
Goats. (11 min) —EB Films
Gray Squirrel. (11 min) —EB Films
Honey Bee. (11 min) —EB Films
The Horse. (11 min) —EB Films
The Horse and Its Relatives. (10 min) —Coronet
House Fly. (11 min) —EB Films
How Animals Defend Themselves. (10 min) —Yng Amer
How Animals Eat. (10 min) —Yng Amer
How Animals Move. (10 min) —Yng Amer
How Nature Protects Animals. (11 min) —EB Films
Hummingbird Home Life. (10 min) —Simmel
The Importance of Water. (10 min) —Transnational
Introduction to Electricity. (10 min) B&W and Color —Coronet
Itchy Scratchy. (30 min) —Wild Life Films
The Jungle. (10 min) Color —TFC
Jungle Giants. (11 min) —TFC
Kenai Moose. (10 min) Silent —Hawley-Lord
The Lamp. (10 min) —Official
Let's Look at Animals. (11 min) —Yng Amer
Life in an Aquarium. (10 min) —Yng Amer
Life in Hot, Dry Lands. (10 min) B&W and Color —Coronet
Life in Mediterranean Lands, Southern California. (10 min) B&W and Color —Coronet
Life on the Western Marshes. (15 min) Color —Nat Film Bd
Light and Shadow. (10 min) —Yng Amer
The Light in Your Life. (29 min) Color —GE
Live Teddy Bears. (10 min) —EB Films
Look to the Future. (16 min) Color Loan —Bates Fabrics
Looking Through Glass. (18 min) —BIS
Magnetism. (10 min) —Coronet
Magnets. (14 min) —Yng Amer
Making Electricity. (11 min) —EB Films
Mammals of the Countryside. (10 min) B&W and Color —Coronet
Mammals of the Rock Mountains. (10 min) B&W and Color —Coronet
Mammals of the Western Plains. (10 min) B&W and Color —Coronet
Marine Circus. (9 min) Color —TFC
Marsh Marauders. (10 min) B&W and Color —Hawley-Lord
Meet the Crabs. (10 min) Color —Holst
Microscopic Mysteries. (10 min) —TFC
Monarch Butterfly. (10 min) B&W and Color —Simmel
The Mosquito. (10 min) —EB Films
Moths. (11 min) —EB Films
The Mountains. (10 min) B&W and Color —A Barr
My Friend, the Harti. (10 min) —Library Films
Nature's Nurseries. (16 min) Silent —Bray
Nature's Tent Builders. (8 min) Silent —Bray
No Vacancy. (6 min) Color —Holst

Nothing But Air. (10 min) —Films Inc.
Oil For Aladdin's Lamp. (20 min) Loan —Shell
On to Jupiter. (20 min) Loan —GM
Orchids. (11 min) Color —US Dept of State
Osmosis. (20 min) —TFC
Our Animal Neighbors. (10 min) B&W and Color —Coronet
Our Common Fuels. (10 min) B&W and Color —Coronet
Our Soil Resources. (10 min) —EB Films
Oxygen. (10 min) B&W and Color —Coronet
Petroleum. (8 min) Silent —Filmsets
Petroleum and Its Products. (10 min) —Films Inc.
Petroleum and Its Uses. (35 min) —USBM
Pigs and Elephants. (10 min) B&W and Color —Coronet
Pirates of the Deep. (15 min) —Bray
Plant Growth. (11 min) —EB Films
Plant Traps. (11 min) —EB Films
Pond Insects. (11 min) —EB Films
Poultry on the Farm. (11 min) —EB Films
Production of Foods. (11 min) —EB Films
Properties of Water. (10 min) B&W and Color —Coronet
Reactions in Plants and Animals. (11 min) —EB Films
The Red Hen. (10 min) Color —A Barr
The Red-Winged Blackbird. (10 min) Color —Coronet
Rikki, the Baby Monkey. (10 min) —EB Films
The River. (32 min) —Castle
The Robin. (10 min) Color —EB Films
Robin Redbreast. (11 min) —EB Films
The Rocky Mountains—Continental Divide. (21 min) B&W and Color —A Barr
Roots of Plants. (11 min) —EB Films
The Ruby Throated Hummingbird. (8 min) Color —Coronet
San Diego Zoo. (12 min) Color Loan —Santa Fe
Sanctuary of the Seals. (9 min) —TFC
Science and Agriculture. (11 min) —EB Films
Science and Superstition. (10 min) B&W and Color —Coronet
The Seashore. (10 min) B&W and Color —A Barr
Seashore Wonderland. (10 min) Color —Holst
The Seasons. (20 min) —TFC
Secrets of the Sea. (10 min) —Post
Seed Dispersal. (11 min) —EB Films
Seeds of Destruction. (10 min) Color —EB Films
Simple Machines. (11 min) —EB Films
Snapping Turtle. (11 min) —EB Films
Snookie, the Adventures of a Black Bear Cub. (20 min) Color —Assn Film Artists
Snow Harvest. (25 min) Color —Castle
Soap. (10 min) —EB Films
Solids, Liquids and Gases. (10 min) —Yng Amer
Song Birds As Neighbors. (12 min) —Bray
The Sounds of Music. (10 min) B&W and Color —Coronet
Spearheads in the Sky. (11 min) Color —Capital
Spiders. (11 min) Sound and Silent —EB Films
Spring on the Farm. (11 min) Color —EB Films
Story of Coal. (11 min) —Know Bldrs
Story of the Bees. (16 min) —UWF
Story of the Butterfly. (15 min) Silent —Bray
Sulphur and Its Compounds. (10 min) B&W and Color —Coronet
Summer on the Farm. (10 min) Color —EB Films
Sunfish. (11 min) —EB Films

SOURCES ARE LISTED ON PAGE 40

The Thermometer Talks. (10 min) —Films Inc.
Things Expand When Heated. (11 min) Sound Yng Amer
This Is the Moon. (11 min) —Yng Amer
This Vital Earth. (11 min) —EB Films
Three Little Kittens. (11 min) —EB Films
Thrushes and Relatives. (11 min) —EB Films
Tiny Water Animals. (11 min) —EB Films
Trees. (10 min) B&W and Color —Coronet
Trip to the Sky. (11 min) —Brandon
Trout Factory. (10 min) B&W and Color —Hawley-Lord
Use of Forests. (10 min) B&W and Color —Coronet
The Valleys. (10 min) B&W and Color —A Barr
The Veldt. (10 min) —TFC
Volcanoes in Action. (11 min) —EB Films
War on Insects. (11 min) —MOT
Water Birds. (11 min) —EB Films
Water Cycle. (9 min) —EB Films
Water in the Air. (10 min) —Films Inc
Water Power. (11 min) B&W Sound & Silent —EB Films
Water Supply. (10 min) Color —Academy
Water Works For Us. (11 min) —Yng Amer
We Make a Fire. (10 min) —Films Inc
Western Birds At Home. (12 min) Silent —Calif U
What Bird Is That? (11 min) Color —Capital
What Is Science? (10 min) B&W and Color —Coronet
What Is Soil? (10 min) —Films Inc
What Is Sound? (11 min) —Yng Amer
What Makes Day and Night. (10 min) —Yng Amer
What Makes Rain. (10 min) —Yng Amer
When Winter Comes. (10 min) —Library Films
Who's Who At the Bronx. (10 min) —Pictorial
Wild Life of the Desert. (10 min) —Bailey
Wing, Claw and Fang. (10 min) —Castle
Winter on the Farm. (11 min) Color —EB Films
Wonders in a Country Stream. (10 min) B&W and Color —Churchill-Wexler
Wonders in Your Own Backyard. (10 min) Color —Churchill-Wexler
Wonders of the Sea. (10 min) —TFC
The Wood Thrush. (10 min) Color —Heidenkamp
Woodland Pals. (15 min) Silent —Bray
Woodpecker, the Farmer's Friend. (5 min) Silent —Bray
Woody Grows Up. (10 min) Color —Simmel
Work of Running Water. (11 min) —EB Films
Work of the Atmosphere. (11 min) —EB Films
World We Live In. (10 min) —Know Bldrs
The Zoo. (11 min) Color —EB Films
Zoo's Who. (9 min) —Official

GEOLOGY

Aerology—Air Masses and Fronts. (25 min) Color —Castle
Aerology—Flying the Weather Map. (27 min) Color —Castle
Aerology—Fog. (25 min) Color —Castle
Aerology—Ice Formation on Aircraft. (48 min) —Castle
Aerology—The Cold Front. (19 min) Color —Castle
Aerology—The Occluded Fronts. (22 min) Color —Castle
Aerology—The Warm Front. (21 min) Color —Castle
Aerology—Thunderstorms. (41 min) —Castle
Birth of a Volcano. (8 min) —Sterling
Birth of an Oilfield. (30 min) Color Loan —Shell
Birthplace of Icebergs. (11 min) —TFC
 (CONTINUED ON THE NEXT PAGE)

Science Film Checklist:

(CONTINUED FROM PRECEDING PAGE)

Bonanza. (45 min) Color Loan —Denver & Rio Grande
Carlsbad Caverns, N.M. (3 min) Color Silent —Nat Park Films
Chilean Nitrate. (10 min) B&W and Color —Coast Visual
Clouds. (11 min) Loan —US Weather Bur
Clouds and Weather. (6 min) —Castle
Clouds Go To Work. (9 min) —EPS
Coal Country. (18 min) B&W and Color —Flory
Coral and Its Creatures. (10 min) —Post
Death Valley Monument. (11 min) Color —Hoefer
The Desert. (8 min) Silent —Filmsets
Earth—Latitude and Longitude. (9 min) —EPS
Erosion by Wind and Water. (9 min) —EPS
Flood. (8 min) —Castle
Flood Weather. (32 min) Loan —US Weather Bur
The Formation of Soil. (15 min) Silent —Nat Audubon Soc
Geological Work of Ice. (11 min) —EB Films
Glacier Park. (22 min) Color —Hoefer
The Great Lakes—How They Were Formed. (10 min) Color —Hollywood Film Ent.
Ground Water. (11 min) —EB Films
Iron Mining. (14 min) B&W and Color —Academy
Krakatoa. (30 min) —Mogull
Limestone Caverns. (11 min) B&W and Color —Coronet
A Lost World. (10 min) Sound & Silent —EB Films
Mammoth Cave, Ky. (3 min) Color Silent —Nat Park Films
Modern Weather Theory: Development and Characteristics of Atmospheric Waves. (15 min) —Castle
Modern Weather Theory: Primary Circulation. (19 min) —Castle
Mountain Building. (11 min) —EB Films
Mysteries of Water. (10 min) —Know Bldrs
Paracutin. (23 min) Loan —USAF
Paracutin—Mountain of Fire. (10 min) B&W and Color —Pictorial
Peat and Coal. (8 min) Silent —Filmsets
Petroleum. (10 min) —EB Films
Prospecting For Petroleum. (23 min) Color Loan —Shell
River of Ice. (10 min) B&W and Color —Bailey
Science At Your Service. (36 min) —Nat Film Bd
Spelanking—A New Science. (20 min) —AF Films
Story of Asbestos. (30 min) Silent Loan —USBM
Story of Sulphur. (9 min) —EPS
Sulphur. (20 min) Color Loan —USBM
Volcanoes in Action. (11 min) —EB Films
Water. (9 min) —Castle
Wearing Away of the Land. (11 min) —EB Films
The Weather. (11 min) —EB Films
Weather Wizards. (9 min) —TFC
What Makes a Desert. (11 min) —Yng Amer
Wind Cave, S.D. (3 min) Color Silent —Nat Park Films
Winds and Their Causes. (10 min) B&W and Color —Coronet
Work of Rivers. (11 min) —EB Films
Work of the Atmosphere. (11 min) —EB Films

MATHEMATICS

Addition Is Easy. (10 min) B&W and Color —Coronet
Algebra in Everyday Life. (10 min) B&W and Color —Coronet

Angles. (12 min) —Know Bldrs
Angles and Arcs in Circles. (10 min) —Know Bldrs
Area. (12 min) —Know Bldrs
Borrowing in Subtraction. (15 min) —TFC
Chords and Tangents of Circles. (10 min) —Know Bldrs
The Circle. (10 min) —Know Bldrs
Congruent Figures. (12 min) —Know Bldrs
Decimal Fractions. (11 min) B&W and Color —Johnson Hunt
Division Is Easy. (10 min) B&W and Color —Coronet
Division of Fractions. (11 min) —Know Bldrs
Fred Meets a Bank. (10 min) B&W and Color —Coronet
Geometry and You. (10 min) B&W and Color —Coronet
How to Add Fractions. (11 min) B&W and Color —Johnson Hunt
How to Change Fractions. (10 min) B&W and Color —Johnson Hunt
How to Divide Fractions. (11 min) B&W and Color —Johnson Hunt
How to Find the Answer. (10 min) B&W and Color —Coronet
How to Multiply Fractions. (10 min) B&W and Color —Johnson Hunt
How to Subtract Fractions. (10 min) B&W and Color —Johnson Hunt
How to Use Decimals. (11 min) —Know Bldrs
How to Use Percentage. (11 min) —Know Bldrs
Indirect Measurement. (12 min) —Know Bldrs
Introduction to Fractions. (11 min) B&W and Color Sound —Johnson Hunt
Introduction To Vectors—Coplanar Concurrent Forces. (22 min) —Castle
The Language of Graphs. (15 min) B&W and Color —Coronet
Language of Mathematics. (10 min) B&W and Color —Coronet
Let's Count. (10 min) B&W and Color —Coronet
Lines and Angles. (12 min) —Know Bldrs
Locus. (12 min) —Know Bldrs
Meaning of Long Division. (16 min) —EB Films
Meaning of Percentage. (11 min) —Yng Amer
The Meaning of Pi. (10 min) B&W and Color —Coronet
Measurement. (10 min) B&W and Color —Coronet
Micrometer. (14 min) —Castle
Multiplication Is Easy. (10 min) B&W and Color —Coronet
Multiplying Fractions. (11 min) —Know Bldrs
Parts of Nine. (11 min) —Yng Amer
Parts of Things. (11 min) —Yng Amer
Percentage. (11 min) B&W and Color —Johnson Hunt
Periodic Functions. (17 min) —Castle
Polygons. (12 min) —Know Bldrs
Practical Geometry. (10 min) —Know Bldrs
Precise Measurements For Engineers. (31 min) —BIS
Principles of Scale Drawing. (10 min) B&W and Color —Coronet
Properties of Triangles. (12 min) —Know Bldrs
Property Taxation. (11 min) —EB Films
Pythagorean Theorem. (12 min) —Know Bldrs
Quadrilaterals. (12 min) —Know Bldrs
Rectilinear Coordinates. (10 min) —Know Bldrs
Similar Triangles. (12 min) —Know Bldrs
Simple Fractions. (12 min) —Know Bldrs

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Slide Rule (Multiplication and Division). (24 min) —Castle
Slide Rule (Percentage, Proportion, Squares and Square Roots. (21 min) —Castle
Subtraction Is Easy. (10 min) B&W and Color —Coronet
Teen Numbers. (10 min) —Yng Amer
Using the Bank. (10 min) —EB Films
We Discover Fractions. (10 min) B&W and Color —Coronet
What Are Decimals? (10 min) Color —Instr Films
What Are Fractions? (10 min) —Films Inc
What Is Four. (16 min) —Yng Amer

PHYSICS

ABC of Internal Combustion. (13 min) color Loan —GM
Aerodynamics—Air Flow. (18 min) —Castle
Aerodynamics—Air Resistance and Streamlining. (8 min) —Bray
Aerodynamics—Forces Acting on an Air Foil. (27 min) —Castle
Aerodynamics—Lift. (8 min) —Castle
Air in Action. (10 min) B&W and Color —Coronet
Application of Pascal's Law: Part I. (12 min) —Castle
Application of Pascal's Law: Part II. (15 min) —Castle
Ash Can Fleet. (11 min) —TFC
Audio Oscillator Operation. (9 min) —Castle
Basic Electricity. (20 min) Color Loan —USAF
Basic Hydraulics. (10 min) Color —Castle
Basic Principles of Frequency Modulation. (31 min) —Castle
Basic Principles of Hydraulics. (11 min) —Jam Handy
Bouncing Molecules. (20 min) Color Loan —Esso
Capacitance. (31 min) —Castle
The Cathode-Ray Tube—How It Works. (15 min) —Castle
Characteristics of Gases. (10 min) —Films Inc
Characteristics of Liquids. (10 min) —Films Inc
Characteristics of Solids. (10 min) —Films Inc
Charging Storage Batteries. (16 min) —Castle
The Compass System. (16 min) —Castle
Corrosion Proof. (12 min) Color—Allegheny-Ludlum
Curves of Color. (10 min) Color Loan —GE
Derivation of Pascal's Law, Part I. (16 min) —Castle
Derivation of Pascal's Law, Part II. (18 min) —Castle
Diesel—The Modern Power. (15 min) —GM
The Diode. (17 min) —Castle
Einstein's Theory of Relativity. (30 min) Silent —Kodascope
Electrical Units. (10 min) —Jam Handy
Electrodynamics. (11 min) —EB Films
The Electron. (16 min) —Castle
The Electron—An Introduction. (16 min) —Castle
Electrons. (11 min) —EB Films
Electrons on Parade. (20 min) —RCA
Electrostatics. (11 min) —EB Films
Elementary Electricity—Amperes, Volts and Ohms. (8 min) —Castle
Elementary Electricity—Current and Electromotive Force. (10 min) —Castle
Elementary Electricity—Series and Parallel Circuits. (8 min) —Castle
Elements of Electrical Circuits. (11 min) —EB Films
Elements of Electricity. (14 min) —Castle
Energy and Its Transformations. (11 min) —EB Films
Exploring With X-Rays. (40 min) Loan —GE

Factors in Depth Perception. (14 min) Silent —Penn St Col
Faster Than Sound. (10 min) —BIS
Fluid Flow in Hydraulic Systems. (9 min) B&W and Color —Abe
Force and Motion. (10 min) B&W and Color —Coronet
Fundamentals of Acoustics. (11 min) —EB Films
Gravity. (10 min) B&W and Color —Coronet
The Gyroscope and Gravitation. (15 min) —Castle
The Gyroscope and the Earth's Rotation. (10 min) —Castle
Harnessing Liquids. (11 min) Loan —Shell
How We Get Our Power. (10 min) —Yng Amer
Inductance. (35 min) —Castle
Industrial Measurement. (8 min) Loan —AT&T
Introduction to Optics. (17 min) —Castle
Introduction to Physics. (10 min) B&W and Color —Coronet
Lever-Age. (22 min) Loan —Shell
Light Waves and Their Uses. (11 min) —EB Films
Machines Do Work. (11 min) —Yng Amer
Magic of Fluorescence. (17 min) Color Loan —GE
Making Electricity. (11 min) —EB Films
Matter and Energy. (10 min) B&W and Color —Coronet
Measurement of Electricity. (10 min) B&W and Color —Coronet
Mechanics of Liquids. (10 min) B&W and Color —Coronet
Metals and Non-metals. (10 min) B&W and Color —Coronet
Methods of Processing Plastic Materials. (22 min) —Castle
Modern Zeus. (10 min) Loan —GE
The Nature of Color. (10 min) Color —Coronet
The Nature of Energy. (10 min) B&W and Color —Coronet
The Nature of Light. (10 min) B&W and Color —Coronet
The Nature of Plastics. (18 min) Color —BIS
Nature of Sound. (10 min) B&W and Color —Coronet
Ohm's Law. (19 min) —Castle
Ohm's Law. (10 min) —Jam Handy
Origin and Synthesis of Plastic Materials. (16 min) —Castle
Oscillators. (13 min) —Castle
Periodic Functions. (17 min) —Castle
Primary Cell. (11 min) —EB Films
Principle of Moments. (23 min) —Castle
The Principle of the Generator. (10 min) —Yng Amer
Principles of Dry Friction. (17 min) —Castle
Principles of Electricity. (20 min) Color Loan —GE
Principles of Gas-Filled Tubes. (15 min) —Castle
Principles of the Gyroscope. (10 min) —Castle
Problems of Flight. (11 min) —EB Films
Radar For Navigation. (10 min) Loan —USCG
Radio Antennas: Creation and Behavior of Radio Waves. (12 min) —Castle
Radio Receivers: Principles Of Radio Receivers. (17 min) —Castle
Radio Service. (19 min) —BIS
Radio Shop Techniques. (38 min) —Castle
RCL Resistance Capacitance. (34 min) —Castle
Receiving Radio Messages. (11 min) —EB Films
Rectangular Coordinates. (13 min) —Castle
Sending Radio Messages. (11 min) —EB Films

Series and Parallel Circuits. (11 min) —EB Films
Signal Generator Operation. (10 min) —Castle
Smoke Streams. (30 min) Silent —Bray
Sound. (9 min) —EPS
Sound Recording and Reproduction. (11 min) —EB Films
Sound Waves and Their Sources. (11 min) —EB Films
Speed and Reflexes. (11 min) —Prog Pic
Standing Waves on Transmission Lines. (27 min) —Castle
Steam Engine. (11 min) —Yng Amer
Steam Turbine. (8 min) —Yng Amer
The Storage Battery. (30 min) —Willard Stor Batt
Story of Electricity. (11 min) —Know Bldrs
Synchro Systems—Part I. (15 min) —Castle
Synchro Systems—Part II. (13 min) —Castle
Taking the X Out of X-Rays. (7 min) Loan —GE
Theory of Flight. (11 min) —EB Films
Thermodynamics. (11 min) —EB Films
Transfer of Heat. (10 min) —Yng Amer
Transmission of Rotary Motion. (10 min) —Yng Amer
Traveling Electrical Waves. (50 min) Silent Loan —MIT
The Triode: Amplification. (14 min) —Castle
Tube Tester Operation. (9 min) —Castle
Turbo-Jet Propulsion. (16 min) —BIS
Vacuum Tubes: (11 min) —EB Films
Vacuum Tubes: Electron Theory and the Diode Tube. (16 min) —Castle
Vectors. (12 min) —Castle
Vibratory Motions and Waves. (20 min) —EPS
Volt Ohm Meter Operation. (15 min) —Castle
Voltaic Cell, Dry Cell, and Storage Battery. (18 min) —Castle
What Is Electricity? (20 min) Loan —Westinghouse
What Makes Things Float? (10 min) —Instr Films
X-Ray Inspection. (21 min) —Castle

ZOOLOGY

African Fauna. (11 min) Color —Hoeffer
The Amoeba. (10 min) —UWF
Arachnida (Spiders and Scorpions). (10 min) —UWF
Aussie Oddities. (10 min) —Austrl News 2nd Inf
Battle of the Centuries. (9 min) —TFC
Beneath Our Feet. (9 min) —TFC
Beneath the Sea. (9 min) —TFC
Biography of a Horned Owl. (10 min) —A Barr
Biological Survey. (15 min) Sound and Silent Loan —NY St Consv Dept
Birds of Canada. (11 min) Color —Nat Film Bd
Birds of North America. (32 units, ca 4 min) Color Silent —Heidenkamp
Birds of the Village. (20 min) —BIS
Cecropia Moth. (13 min) Silent —Ed Films
The Cicada. (20 min) —Castle (Loan—USDA)
Color Categorizing Behavior Of Rhesus Monkeys. (10 min) Color —Coronet
The Cony. (10 min) —A Barr
The Cooper Hawk. (10 min) —A Barr
The Crayfish. (10 min) —UWF
Deadly Females. (10 min) —Library Films
Denizens of Death Valley. (18 min) —Bailey
Development of a Bird Embryo. (15 min) Silent —EB Films
Dwellers of the Forest. (12 min) Silent —Calif U
Earthworms. (10 min) —UWF
The Eighth Plague. (11 min) —BIS
Fly As a Disease Carrier. (15 min) Silent —Bray
Frog. (11 min) —EB Films
The Frog. (10 min) —UWF
Frogs, Toads and Salamanders. (15 min) Silent —Nat Audubon Soc
Hermits of Crabland. (10 min) —Library Films
High Over the Borders. (21 min) —NY Zool
How Birds Feed Their Young. (6 min) Color Silent —EB Films
How the Mosquito Spreads Disease. (15 min) Silent —Bray
Humming Bird. (8 min) Silent —Bray
The Kangaroo Rat. (10 min) —A Barr
Kenai Big Game. (10 min) B&W and Color —Hawley-Lord
Killers. (10 min) —TFC
Life at the Zoo. (10 min) —Brandon
Life Cycle of a Fly. (10 min) —UWF
Life Cycle of a Trout. (10 min) —UWF
Life Cycle of the Mosquito. (12 min) —Yng Amer
Life Cycle of the Muscovy Duck. (11 min) B&W and Color —Bailey
Life in a Drop of Water. (10 min) B&W and Color —Coronet
Life of an Ant. (10 min) —Commonwealth
Life of the Harvester Ant—Part 1. (11 min) B&W and Color —Tompkins
Little Friend of the Wild. (15 min) Silent —Bray
Living Jewels. (10 min) —Library Films
Marine Animals and Their Foods (8 min) B&W and Color —Coronet
Mormon Cricket. (22 min) —Castle
Mosquito—Public Enemy. (14 min) —Castle (Loan—USDA)
Mosquitoes. (50 min) Silent —Castle
Moth and Butterfly. (10 min) —Amer Film Reg
Nature's Songsters. (8 min) —Skibo
New Homes For Beavers. (10 min) —Nat Film Bd
Oyster and Virginia. (20 min) B&W and Color —Va St Dept Ed
Paramecium. (10 min) UWF
People of the Ponds. (10 min) —Post
Pipeline Swallowtail Butterfly. (16 min) B&W and Color —Simmel
Praying Mantis. (11 min) Color —Hollywood Film Ent.
Private Life of the Gannets. (11 min) —Skibo
Protoplasm—The Beginning of Life. (15 min) Silent —Bray
Protozoa: One-Cell Animals. (15 min) Silent —EB Films
Realm of the Honeybee. (41 min) Silent —Castle
Realm of the Wild. (27 min) Color —Castle (Loan—USDA)
Return of the Vanishing Herd. (10 min) Color —Hardcastle
The Roadrunner. (10 min) —A Barr
Salmon Run. (21 min) Color —Nat Film Bd
Salt Water Wonderland. (9 min) B&W and Color —Hawley-Lord
Sea. (10 min) —TFC
Sea Urchin. (10 min) —UWF
Seashore Oddities. (20 min) Color —Yng Amer
Simba. (90 min) —Am Museum Nat Hist
Snail's Pace. (10 min) —Bailey
Snakes. (10 min) B&W and Color —Coronet
Snakes Are Interesting. (10 min) —Assoc Film Artists
Spotted Wings. (10 min) —Brandon
The Story of the Blue Crab. (30 min) Silent —Castle
Strange Sea Shells. (10 min) —Post
Swampland. (10 min) —Library Films
Tide Pool Life. (11 min) B&W and Color —Simmel

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(CONTINUED ON THE NEXT PAGE)

Science Film Checklist:

(CONTINUED FROM PRECEDING PAGE)

Underground Farmers. (10 min) —Library Films
Unusual Molluscs. (10 min) —Library Films
Vegetable Insects. (23 min) Color —Nat Film Bd
Vorticella. (12 min) Silent —EPS
Western Waterfowl. (12 min) Silent —Calif. U

Wild Animals—Their Homes and Habits. (10 min) —A Barr
Wild Elephant Roundup. (10 min) —Castle
Wild Fowl in Slow Motion. (9 min) B&W and Color —Hawley-Lord
Wild Life in Africa. (10 min) Color —Africa Films
Wild Life on the Desert. (12 min) Silent —Calif U
Wild Life on the Veldt. (10 min) —TFC
Winter Visitors. (12 min) Silent —Calif U
Wonders of the Deep. (10 min) —BIS

McGraw-Hill: McGraw-Hill Book Co., Text-Film Dept., 330 W. 42nd St., New York 18
Mich U: University of Michigan, Audio-Visual Education Center, Ann Arbor, Mich.
MIT: Massachusetts Institute of Technology, 69 Massachusetts Ave., Cambridge 39, Mass.

Modern: Modern Talking Picture Service, Inc., 45 Rockefeller Plaza, New York 20; 142 E. Ontario St., Chicago 11.

Mogull: Mogull Bros., Inc., 112-114 W. 48th St., New York 19

MOT: March of Time Forum Films, 369 Lexington Ave., New York 17

Nat Audubon Soc: National Audubon Society, 1000 Fifth Ave., New York 28

Nat Fertilizer: National Fertilizer Association, 616 Investment Bldg., Washington 5, D.C.

Nat Film Bd: National Film Board of Canada, 1270 Avenue of the Americas, New York 20; 400 W. Madison St., Chicago, Illinois

Nestor Prod: Nestor Productions, Inc., 7904 Santa Monica Blvd., Los Angeles 46, Calif.

New York U: New York University Film Library, 26 Washington Pl., New York 3

NY St Cons Dept: New York State Conservation Department, Div. of Conservation Education, Broadway Arcade Bldg., Albany 7, N.Y.

NY Times: New York Times School Service Department, 229 W. 43d St., New York 18

NY Zool: New York Zoological Society, 185th St. and Southern Blvd., New York 60

Official: Official Films, Inc., 25 W. 45th St., New York 19

Ott: John Ott Pictures, Inc., 730 Elm St., Winnetka, Ill.

Penn St Coll: Pennsylvania State College, State College, Pa.

Phase Films: Arthur T. Brice, P.O. Box 423, Ross, Calif.

Pictorial: Pictorial Films, Inc., 625 Madison Ave., New York 22

Pop Sci: Popular Science Publishing Co., Audio-Visual Div., 353 Fourth Ave., New York

Post: Post Pictures Corp., 115 W. 45th St., New York 19

Princeton: Princeton Film Center, 55 Mountain Ave., Princeton, N.J.

Prog Pic: Progressive Pictures, 6351 Thornhill Dr., Oakland 11, Calif.

RCA: Radio Corporation of America, Victor Division, Camden, N.J.

Row, Peterson: Row, Peterson & Co., 1911 Ridge Ave., Evanston, Ill.

Santa Fe: Santa Fe Film Bureau, 80 E. Jackson Blvd., Chicago 4, Ill.

Shell: Shell Oil Co., Public Relations Dept., 50 W. 50th St., New York 20

Simmel: Simmel-Meserve, Inc., 321 S. Beverly Drive, Beverly Hills, Calif.

Skibo: Skibo Productions, Inc., 165 W. 46th St., New York 19

So Pulpwood: Southern Pulpwood Conservation Association, 1506 First National Bank Bldg., Atlanta, Ga.

St Oil NJ: Standard Oil Co. (N.J.), 30 Rockefeller Plaza, New York 20

Sterling: Sterling Films, Inc., 316 W. 57th St., New York 19

Stillfilm, Inc.: 171 S. Los Robles, Pasadena 5, Calif.

Sugar Info: Sugar Information, Inc., 52 Wall St., New York 5

Sugar Res Foundation: Sugar Research Foundation, Inc., 52 Wall St., New York 5

SVE: Society for Visual Education, Inc., 1345 W. Diversey Parkway, Chicago 14, Ill.

Tex for Serv: Texas Forest Service, Texas A & M College, College Station, Tex.

TFC: Teaching Film Custodians, Inc., 25 W. 43d St., New York 18

Tompkins: Tompkins Films, 1046 W. Edgeware Rd., Los Angeles 26, Calif.

Science Film & Filmstrip Sources

A Barr: Arthur Barr Productions, 1265 Bresee Ave., Pasadena 7, Calif.

Abel: Abelard Educational Films, Inc., 1440 Broadway, New York 18

Academy: Academy Films, P.O. Box 3088, Hollywood, Calif.

AF Films: A. F. Films, Inc., Room 1001, 1600 Broadway, New York 19

Allegheny-Ludlum: Allegheny Ludlum Steel Corp., 532 Oliver Bldg., Pittsburgh 2, Pa.

Am Film Reg: American Film Registry, 28 E. Jackson Blvd., Chicago 4, Ill.

Am Gas: American Gas Association, 420 Lexington Ave., New York 17

Am Nat Livestock Assn: American National Livestock Association, Press Bldg., Sheridan, Wyo.

Am Museum Nat Hist: American Museum of Natural History, 79th St. & Central Park West, New York 24

Am Potash: American Potash Institute, 1155 16th St., N.W., Washington, D.C.

Am Soc Metals: American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio

Assoc Film Artists: Associated Film Artists, 30 N. Raymond Ave., Pasadena 1, Calif.

AT&T: American Telephone and Telegraph Co., Information Dept., Film & Display Div., 195 Broadway, New York 7

Aud-Vis Ent: Audio-Visual Enterprises, 4405 Springdale Dr., Los Angeles 43, Calif.

Austri News & Inf: Australian News and Information Bureau, 630 Fifth Ave., New York 20

Bailey: Bailey Films, Inc., 2044 N. Berendo St., Hollywood 27, Calif.

Bates Fabrics: Bates Manufacturing Co., 30 Vesey St., New York 7

BIS: British Information Services, 30 Rockefeller Plaza, New York 20

Brandon: Brandon Films, Inc., 1700 Broadway, New York 19

Bray: Bray Studios, Inc., 729 Seventh Ave., New York 19

CAA: Civil Aeronautics Administration, Aud-Vis. Training Aids Staff, A-165 Commerce Bldg., Washington 25, D. C.

Calif Tech: California Institute of Technology, Public Relations, 1201 E. California St., Pasadena 4, Calif.

Capital: Capital Film Service, 224 Abbot Rd., East Lansing, Mich.

Castle: Castle Films Division, United World Films, Inc., 445 Park Ave., New York City.

Churchill-Wexler: Churchill-Wexler Film Productions, 137 N. La Brea Ave., Los Angeles 36, Calif.

Classroom Films: Classroom Films, Inc., 1585 Broadway, New York 19

Coast Visual: Coast Visual Education Co., 6058 Sunset Blvd., Hollywood 28, Calif.

Commonwealth: Commonwealth Pictures Corp., 723 Seventh Ave., New York 19

Coronet: Coronet Instructional Films, 65 E. South Water St., Chicago 1, Ill.

Curriculum: Curriculum Films, 14-17 Crescent Blvd., Long Island City 1, N.Y.

Denver & Rio Grande RR: Denver and Rio Grande Western Railroad, Rio Grande Bldg., Denver 1, Colo.

Depicto: Depicto Films, 245 W. 55th St., New York

DuPont: E. I. du Pont de Nemours & Co., 10th and Market Sts., Wilmington 98, Del.

EB Films: Encyclopaedia Britannica Films, Inc., 1150 Wilmette Ave., Wilmette, Ill.

Ed Films: Educational Film Service, 180 N. Union St., Battle Creek, Mich.

EPS: Edited Pictures System, Inc., 165 W. 46th St., New York 19

Esso: Esso Standard Oil Co., 15 W. 51st St., New York 19

Eye Gate: Eye Gate House, Inc., 330 W. 42nd St., New York 18

Field & Stream: Field and Stream Magazine, 515 Madison Ave., New York 22

Film Pub: Film Publishers, Inc., 25 Broad St., New York 4

Films Inc: Films, Inc., 330 W. 42nd St., New York 18

Filmsets: Filmsets, Inc., 1956 N. Seminary Ave., Chicago 14, Ill.

Flory: Flory Films, Inc., 303 E. 71st St., New York 21

GE: General Electric Co., Distribution Section, Advertising and Sales Promotion, 1 River Rd., Schenectady, N.Y.

GM: General Motors Corp., Dept. of Public Relations, Film Dist. Section, 3044 W. Grand Blvd., Detroit 2, Mich.

Grubbs: Hollywood Film Enterprises, Inc., 6040 Sunset Blvd., Hollywood 48, Calif.

Hardcastle: Hardcastle Films, 818 Olive St., St. Louis 1, Mo.

Hawley-Lord: Hawley-Lord, Inc., 61 W. 56th St., New York 19

Heidenkamp: Heidenkamp Nature Pictures, 538 Glen Arden Dr., Pittsburgh 8, Pa.

Hoefler: Paul Hoefler Productions, 612½ S. Ridgeley Dr., Los Angeles 36, Calif.

Holst: Kenneth L. Holst, 332 E. Walnut St., Pasadena 1, Calif.

Indiana U: Indiana University, Audio-Visual Center, Bloomington, Ind.

Instr Films: Instructional Films, Inc., 330 W. 42nd St., New York

Int FB: International Film Bureau, Suite 1500, 6 N. Michigan Ave., Chicago 2, Ill.

Jam Handy: The Jam Handy Organization, 2821 E. Grand Blvd., Detroit 11, Mich.

Johnson Hunt: Johnson Hunt Productions, 1133 N. Highland Ave., Hollywood 38.

Know Bldrs: Knowledge Builders, 625 Madison Ave., New York 22

Kodascope: Eastman Kodak Stores, Inc., Kodascope Libraries Div., 356 Madison Ave., New York 17

Lewellen: Lewellen's Productions, 8 S. Michigan Ave., Chicago 3, Ill.

Library Films: Library Films, Inc., 25 W. 45th St., New York 19

Life: Life Magazine, Inc., 9 Rockefeller Plaza, New York 20

Long Filmstrip Service: 944 Regal Rd., Berkeley 8, Calif.

Transnational: Trans-National Productions, Box 267, Temple City, Calif.
Trindl-King, 123 S. Bowling Green Way, Los Angeles 24, Calif.

UN Film Division: United Nations, Film Division, Lake Success, N.Y.

US Army: Write Office of the Commanding General, Attn. Signal Officer, at your nearest U. S. Army Area Hdq.

USAF: U.S. Department of the Air Force, Directorate of Public Relations, Washington 25, D.C.

USBM: U.S. Bureau of Mines, Experiment Station, Graphic Services Section, 4800 Forbes St., Pittsburgh 13, Pa.

USCG: U.S. Coast Guard Headquarters, Chief, Public Information Div., Washington 25, D.C.

USDA: U.S. Department of Agriculture, Motion Picture Service, Office of Information, Washington 25, D.C.

US Dept of State: U.S. Department of State, Office of Information and Educational Exchange, 35 W. 45th St., New York 19

USF&W: U.S. Fish and Wildlife Service, Dept. of the Interior, Washington 25, D.C.

USFS: U.S. Forest Service, Washington 25, D.C.

USN: Motion Picture Section, Office of Public Information, Executive Office of the Secretary, Navy Dept., Washington 25

USOE: U.S. Office of Education, Visual Aids Division, Washington 25, D.C. (See Castle)

US Weather Bureau, Dept. of Commerce, Washington 25, D.C.

UWF: United World Films, Inc., 1445 Park Ave., New York 29

Va State Dept Ed: Virginia State Department of Education, Film Production Service, Richmond 16, Va.

Vis Sciences: Visual Sciences, Suffern, N.Y.
Westing: Westinghouse Electric Corp., Film Div., Box 868, 511 Wood St., Pittsburgh 30, Pa.

Wild Life Films: 6063 Sunset Blvd., Hollywood 28, Calif.

Willard Stor Bat: Willard Storage Battery Co., 246-286 E. 131st St., Cleveland 1, Ohio

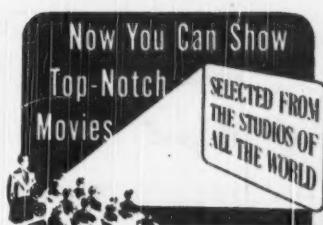
Yng Amer: Young America Films, Inc., 18 E. 41st St., New York 17

How to Get Films

• Sources listed in these pages are producers of the materials; write them for catalogs and names of nearest dealers or special representatives. A great majority of the films listed may also be rented or purchased from your nearest state, county, or regional film library as well as from such commercial libraries as Association Films, Ideal Pictures, etc. and local audio-visual dealers.

Sponsored films are available from Association Films and Modern Talking Picture Service, Inc. The latter organization serves Aluminum, Westinghouse and similar science subject sponsors.

Supplementary data on films overlooked by our researchers will appear in subsequent issues; please write at once if such listings are wanted. Extra copies of this complete issue are available at 50c with liberal discounts on quantity orders to schools and libraries.



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A-V Equipment Quality Trend

◆ With several high-precision, professional-type new 16mm sound projectors in the offing and new quality lenses, higher-fidelity sound and other advantages already available on current models, a definite trend toward new quality standards is apparent in the a-v equipment field this spring.

Portable School Window Shades Offered by Draper Shade Co.

◆ One practical answer to economical darkening of classrooms for film and filmstrip showings is the Portable Pakfold manufactured by Luther O. Draper Shade Company. For while most schools can hardly afford to purchase a darkening shade for each window of every classroom, the Pakfold provides portable windowshades which may be carried from room to room with the projector.

The only permanent fixture required is a small, inexpensive pulley bracket at the head of each window. The shades are adaptable to windows of any size or style.

Draper also manufactures the Draper X-L Shading Units which are used for darkening extremely wide or multiple windows. These units are useful for covering glass block areas as well.

New Magnecord Unit Eliminates

Rewinding Job in Tape Recordings

◆ Instructors in music, speech or language courses can replay tape recordings quickly and automatically with the new Magnecord PT6-EL Continuous Loop Panel. In this unit the beginning and end of the tape are joined together in an endless loop and messages from two seconds to fifteen minutes long can be played continually.

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Brush Co. Studies School Use of Magnetic Tape Recording

◆ Robert L. Shearer, magnetic recording engineer, has been named sales manager of the Cleveland district of The Brush Development Company. The new Cleveland office will sell and distribute the Sound-mirror magnetic tape recording machine designed for use in schools, home and industry.

Brush is now completing a study of teaching techniques using magnetic tape recording and the company representatives are joining in discussions with educators to enable schools to take full advantage of this type of recording.

Wisconsin Audio-Visual Director Shows Community How Films Serve

◆ "The problem of carrying the community with us is best met, in our locality, through the very medium we are trying to explain—the audio-visual medium," says R. C. Wheeler, director of Audio-Visual Supervision, Waukesha, Wisc., and president of the Wisconsin Department of Audio-Visual Instruction.

"During American Education Week, the Waukesha schools set up window displays in downtown stores to show the various activities of the city schools," he continues. "Until this year the audio-visual display had consisted of an assortment of audio-visual equipment. This year we shot 35mm colored pictures and put them in an automatic slide projector which was set up in one of the downtown store windows. The pictures are used in the classrooms of Waukesha and appropriate titles accompanied the pictures.

"The display stopped traffic day and night and excited much favorable comment," Mr. Wheeler says. "It appears to be the most effective way of carrying the audio-visual story to John Q. Public."

For further information on this technique write R. O. Wheeler, Director of Audio Visual Supervision, Waukesha, Wisc.

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Jam Handy Organization, Inc., Transportation Bldg., Washington 6.

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Stanley-Winthrops, Inc., 90 Washington St., Quincy 69 and 20 Shawmut St., Boston 16.

• NEW HAMPSHIRE •

A. H. Rice Co., Inc., 78 West Central Street, Manchester.

• NEW JERSEY •

Slidecraft Co., South Orange, N. J.

• NEW YORK •

Association Films, Inc., 35 West 45th St., New York 19.

Institutional Cinema Service, Inc., 1560 Broadway, New York 19.

Jam Handy Organization, Inc., 1775 Broadway, New York, N. Y.

Visual Sciences, 5995H Suffern.

• PENNSYLVANIA •

Harry M. Reed, P. O. Box No. 447, Lancaster.

Jam Handy Organization, Inc., 917 Liberty Ave., Pittsburgh 22.

Karel Sound Film Library, 410 Third Ave., Pittsburgh 19.

Clem Williams Films, 311 Market Street, Pittsburgh 22.

L. C. Vath, Visual Education Supplies, Sharpville, Route 18.

SOUTHERN STATES

• FLORIDA •

Norman Laboratories & Studio, Arlington Suburb, Jacksonville, 7.

• LOUISIANA •

Jasper Ewing & Sons, 725 Poydras St., New Orleans 12.

• MISSISSIPPI •

Jasper Ewing & Sons, 227 S. State St., Jackson 2.

• SOUTH CAROLINA •

Palmetto Pictures, Inc., 719 Saluda Ave. at 5 Points, Columbus 11.

• TENNESSEE •

Sam Orleans and Associates, Inc., 211 W. Cumberland Ave., Knoxville 15.

Southern Visual Films, 686-689 Shrine Bldg., Memphis.

MIDWESTERN STATES

• ILLINOIS •

American Film Registry, 28 E. Jackson, Chicago 4, Har. 2691.

Association Films, Inc., 206 S. Michigan Ave., Chicago 3.

Jam Handy Organization, Inc., 230 N. Michigan Ave., Chicago 1.

Swank Motion Pictures, 614 N. Skinker Blvd., St. Louis 5, Mo.

• INDIANA •

Indiana Visual Aids Co., Inc., 726 N. Illinois St., Indianapolis 6.

• IOWA •

Ryan Visual Aids Service, 409-11 Harrison St., Davenport.

• KANSAS-MISSOURI •

Select Motion Pictures, 1326-A Oak St., Kansas City 6, Mo.

Swank Motion Pictures, 614 N. Skinker Blvd., St. Louis 5, Mo.

• MICHIGAN •

Cosmopolitan Films, 3248 Gratiot Ave., Detroit 7.

Jam Handy Organization, Inc., 2821 E. Grand Blvd., Detroit 11.

Locke Films, Inc., 120 W. Lovell St., Kalamazoo 8.

• OHIO •

Academy Film Service Inc., 2300 Payne Ave., Cleveland 14.

Sunray Films, Inc., 2108 Payne Ave., Cleveland 14.

Jam Handy Organization, Inc., 310 Talbott Building, Dayton 2.

WESTERN STATES

• CALIFORNIA •

Coast Visual Education Co., 6058 Sunset Blvd., Hollywood 28.

Jam Handy Organization, Inc., 7046 Hollywood Blvd., Los Angeles 28.

Association Films, Inc., 351 Turk St., San Francisco 2.

• OREGON •

Moore's Motion Picture Service, 306 S. W. 9th Avenue, Portland 5.

• TEXAS •

Association Films, Inc., 3012 Maple Ave., Dallas 4.

Audio Video, Incorporated, 4000 Ross Avenue, Dallas 4, Texas.

George H. Mitchell Co., 712 N. Haskell, Dallas 1.

• UTAH •

Deseret Book Company, 44 E. So. Temple St., Salt Lake City 10.

• HAWAII •

Motion Picture Enterprises, 121 S. Beletania St., Honolulu, T. H.

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156 King St., West, Toronto, Ont.
 535 W. Georgia St., Vancouver, B. C.

810 Confederation Life Bldg., Winnipeg, Man.

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Dealers: for listings in these pages write for information and reference form to SEE & HEAR

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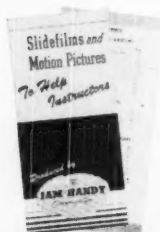
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